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FOOD AND NUTRITION RESEARCH CENTER
Manila

NUTRITION SURVEY OF THE CAGAYAN VALLEY-BATANES REGION

I

DIETARY PHASE

By Elena S. Quiogue, Gracia M. Villavieja, Nieves W. Cadavillo, and Evangelina M. Palma

II

BIOCHEMICAL PHASE

By Benigna V. Roxas, Leon G. Alejo, Lourdes A. Salamat, Miriam D. Kuizon, Rosita D. Salud, and Eladio M. Tinio

III

CLINICAL PHASE

By Alfonso J. Matawaran, Josefina Bulatao-Jayme, Fredesuinda L. Peralta, Felicitas F. Piedad, Alicia B. de Gala, and Lea Hortelano

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INTRODUCTION

A nutrition survey of the Cagayan Valley-Batanes region (Figure A) was conducted April through June, 1961, the fifth in the series of regional nutrition surveys which started in 1957. The provinces included in this region are Batanes, Cagayan, Isabela, and Nueva Vizcaya. The previous regions surveyed were Bicol and Central Luzon (1957), Metropolitan Manila (1958 and 1959), and Ilocos-Mountain Province (1960). These yearly nutrition surveys conducted by the Food and Nutrition Research Center (FNRC) under the National Institute of Science and Technology (NIST), National Science Development Board (NSDB) are intended to cover the ten regions of the country.

This report covers the results of the dietary phase, one of the three phases of the nutrition survey. It consists of the study of the quantity and quality of the food intake of the population sample during the survey period. The other two phases are the clinical, or examination of the population for signs and symptoms of malnutrition, and the biochemical, or investigation of the blood and urine for nutrient levels as a means of pin-pointing nutritional deficiencies before clinical symptoms are manifested. Together, the results of these 3 phases of the nutrition survey present a picture of the nutritional status of the population sample, and being the statistical sample that it is, the nutritional picture of the region as a whole.

I.

DIETARY PHASE

THE SAMPLE

The population sample for the dietary phase of the nutrition survey in the Cagayan Valley-Batanes region consisted of 293 households with a total membership of 1,814 persons (Table 1). The average household size was 6.2 members. Only 8 households consisted of 12 to 16 members (Table 2).

The adult males and females almost equally constituted approximately 2/5 (39%) of the total population sample, the females exceeding the males by 2%. Children from 0 to 12 years constituted less than half of the sample (45%), and the remaining 17% was made up of children from 13 to 20 years of age. In general, the number of children from 0 to 20 years of age exceeded the adult males and females by 22% (Table 3). Eleven (11) pregnant and/or lactating women were counted under the 13 to 20-year age group in Table 2 (age breakdown), but under pregnant and/or lactating in Table 3. Hence the difference of 11 in the totals, which was not a discrepancy in counting.

The greatest bulk of the sample households (261) was concentrated in the provinces of Cagayan and Isabela, the remaining 32 households being located in the provinces of Batanes (6) and Nueva Vizcaya (26) (Table 1). Although Ilocano was the principal dialect spoken by the great majority (69%) of the households spread throughout the region, several other local dialects were encountered in the different provinces . . . "Itawes" in Cagayan, "Ibanag" in Isabela, "Gaddang" in Nueva Vizcaya, and "Ibatan" in Batanes. The other dialects spoken by a few of the households were "Tagalog", "Pangasinense", and "Pampango" (Fig. 14).

PROCEDURES

Three-day food intakes of every sample household were weighed as purchased (A.P.), i.e. with bones, stones, shells, peelings, etc. The three meals of the day, as well as left-overs and between-meal snacks were weighed during the survey days. Tuesday, Wednesday, and Thursday were the days selected for the food weighing as these 3 middle days of the week were found to be the days least affected by week-end food habits which may either be too festive or lean, depending on various social and economic factors.

The nutrition survey was conducted during the months of April, May, and June, 1961. These are summer months, the most convenient time for field data collection when schools are not in session, and there are no rains and storms to upset the survey schedule; also, all of the preceeding surveys had always been conducted at about this time of the year.

The three survey teams — dietary, clinical, and biochemical, moved from one survey area to the next at weekly intervals until all of the sample households throughout the region were covered. Approximately 30 households were covered in a week's time. At the rate of 3 households for each of 10 dietary workers, the whole survey sample took approximately 10 weeks to complete. A survey coordinator had the responsibility of coordinating the work of the 3 teams, performing liaison work between the teams and the local officials in the survey areas, and supervising the field data collection of the dietary workers.

Between food weighing, the dietary worker, with the use of mimeographed questionnaires, observed and interviewed housewives on their food preparation and cooking practices, food storage and cooking facilities, infant feeding and weaning practices, sources of nutrition information, extent of home food production, food beliefs, superstitions, and attitudes about certain foods, occupation, educational levels, and other factors which have possible influences on food intake.

NUTRITIONAL RECOMMENDATIONS

"Recommended allowances" are goals or objectives towards which the planning of practical dietaries is aimed. They are used as tentative standards or yardsticks against which adequacy of the diet is measured with respect to certain specific nutrients.

Recommended allowances for foods and nutrients were computed from FNRC Tables I, "Recommended Daily Allowances for Specific Nutrients" (5) and II, "Recommended Daily Food Allowances by Sex, Group Activity, and Age Group" (6) using the breakdown of the survey population by age, sex, physical state, and activity status (Table 3).

Per capita food and nutrient intakes were computed by counting each member of the household as one, including infants, whether they partook of the family food supply or not. Correction factors were applied in the adjustment of food intakes for visitors and missed meals, in the conversion of cooked to raw weights where food waste had to be deducted from the original raw weights recorded, and in the conversion of different forms of canned or processed milk to whole milk (4).

Food intakes were tabulated in detail, following the food groupings in FNRC Table II (6). English names were used together with their corresponding local names. For further identification of the foods cited, a list of scientific names has been appended to the report (Appendix A). For the benefit of food planners and others, A.P. (as purchased) weights of foods have been presented together with their corresponding E.P. (edible portion) weights in Table 5 and 6. All other tables on food and nutrient intakes are in term of E.P. weights only.

NUTRITIONAL EVALUATION AND RATING OF THE FOOD INTAKE

Nutritional evaluation of the food intake was computed from FNRC Food Composition Tables, supplemented by foreign food composition tables (2, 7, 13). The diet was evaluated in terms of calories, carbohydrates, fats, proteins, minerals calcium and iron, and vitamins A, thiamine, riboflavin, niacin, and ascorbic acid, as these are the nutrients for which allowances have been determined and for which our foods have been chemically analyzed. The percentage contribution of the different food groups to calories and nutrients was determined so as to establish the importance of the different foods in the diet of the population under study (Table 7). The calorie distribution and the ratios of animal and vegetable sources of protein, fat, iron, and vitamin A were tabulated and charted, as well as that of fresh and cooked sources of ascorbic acid (Fig. 3).

The households were grouped by number of members, average years of schooling, per capita food expense, and occupation of household heads, and their food intakes evaluated against these factors to determine the extent of their influence on the diet. They were also rated according to how their nutrient intakes compare with the recommended allowances for the different nutrients (Fig. 2) as well as by a diet rating that represented a general percentage adequacy of all nutrients (Table 8). Thus, both the general picture and the particular nutritional deficiencies of the diet were shown.

The term "household" has been used in this, as in our previous reports, to include all members of a household living under one roof and sharing the same food supply, whether they belong to the same family or not. Thus, maids and other household members not related to the family are included under the term "household".

Diet ratings for each household were computed by adding all percentages of adequacy for each of 9 nutrients and then dividing the total by 9, the number of nutrients for which the diet was evaluated. In adding these percentages, any figure above 100% (for those meeting more than the recommended allowances) was pegged at 100 to prevent undue weighting resulting from excess of any one nutrient.

No attempt was made to evaluate nutrient losses resulting from different food preparation and cooking techniques, in view of lack of our own standards against which to measure such losses.

RESULTS

General Diet Pattern

The predominant foods used in the Cagayan Valley-Batanes diet were "cereals" mostly rice, and "fruits and vegetables", the only two food groups that met recommended allowances (Fig. 1). Other than "meat, poultry, and fish" which came up to only 68% of recommended allowances, the average intake of all other foods ranged from 12 to 77% of recommended levels. By weight, these amounted to 5 to 47 grams of the different food groups per capita per day.

Common food combinations in the usual 3 meals of the day consisted of fish or meat, boiled or sauted vegetables, fruits occasionally, and boiled rice (or corn, particularly in the Cagayan towns and barrios). Methods of cooking fish or meat included frying, boiling with vegetable, broiling, and "paksiw" or "pangat", which is slow boiling with vinegar, salt, and spices like ginger, garlic, or peppercorn. The plainest and simplest methods of cooking foods were generally employed.

The per capita cost of food consumed was computed on the basis of the per capita food intake, using the results of the food expenses reported by the housewife during the survey period. In the case of foods which were either home produced or received as gifts, costs were computed on the basis of the market survey of food prices conducted in the survey locality during the survey period. Results showed a daily per capita food expense of 43 centavos (₱0.43), out of which 17 centavos (₱0.17) were spent for "cereals", 12 centavos (₱0.12) for "meat, poultry and fish", 7 centavos (₱0.07) for "vegetables and fruits", and 7 centavos (₱0.07) for all other foods combined. The breakdown of the food peso following this daily per capita food expense is shown in Fig. 4. It will be noted in Fig. 11 that 2/3 of the total households spent from 10 up to 49 centavos (₱0.49) per capita per day for food, and the remaining 1/3 spent from 50 centavos up to one peso and 30 centavos (₱1.30), decreasing in number as the cost went higher.

Food Intake

Food intakes are summarized below in whole numbers; however, for the exact amounts, reference is made to Table 6, which gives a detailed per capita intake of every single food item consumed by the households during the 3-day dietary survey. All foods and nutrients are reported in terms of average intakes per capita per day.

Cereals

This food group constituted almost half of the total food intake. Rice was the principal cereal consumed (267 grams), a very small proportion of which was unpolished (4%). Rice products used in very small amounts included rice cakes, rice flour and noodles, and poprice.

Other cereals consumed included corn, mostly ground white and yellow, in the amount of 72 grams. Other forms were also noted, in cobs, as popcorn, as flour, or as ground corn used as coffee.

Different types of bakery products made from white flour were used, such as bread, cookies, cakes, and biscuits, as well as other products like noodles and products stuffed with "mung bean" ("hopia").

Starchy roots and tubers

By weight, this food group constituted only 6% of the total food intake. Most commonly used were white sweet potatoes and white and purple yam, all these amounting to 87% of the food group. The other roots consumed, although in much smaller amounts were taro ("gabi"), potatoes, yellow sweet potatoes ("kamote") and cassava ("kamoteng kahoy").

Sugars and syrups

Brown sugar was more commonly used than white, usually for the sweetening of coffee and other beverages. Other types used were crude sugar, molasses, caramel, candies, sweets, and jams. Total amount used of this food group amounted to 4 teaspoons per capita per day (20 grams).

Dried beans, nuts, and seeds

A wide variety of beans, nuts, and seeds were used, but the amounts taken of them (13 grams) were too small to give any significant contribution to the diet. The types commonly used were green and yellow mung beans, cowpeas, white, red, and black beans, snap beans, soybeans and its products like soy sauce and soybean curds, lima beans, pigeon peas, peanuts, and jackfruit seeds.

They were usually eaten boiled or sautéd, and mixed with meats or other vegetables, dried or ground, roasted, and used as coffee.

Leafy and yellow vegetables

The most popularly used vegetables in this group were squash fruit, leaves, and flowers, swamp cabbage, "malunggay" leaves, and leaves of taro, sweet potato, bittermelon, and "saluyot" (jute). Other types used in much smaller amounts were Chinese cabbage ("pechay"), yard-long bean leaves ("sitaw"), malabar nightshade ("alugbati"), onion leaves, "chili" pepper leaves, mustard, ferns, sponge gourd leaves, and many other locally grown vegetables. The per capita intake of these vegetables amounted to 24 grams.

Vitamin C-rich foods

Prominently used foods of this group were tomatoes and mangoes amounting to 12 grams of each. Other fruits which were consumed in half or less than half of this amount were ripe papaya, unripe and half-ripe mango, citrus fruits as pomelo, lime, orange (Sunkist), mandarin, and "kalamansi", Spanish plum, guava, carristel ("tiesa"), carambola ("balimbing"), and "datiles", "kabuyao", and "kamotsili". Altogether, per capita consumption of this group amounted to 37 grams.

Other fruits and vegetables

Besides "cereals", this was the only other food group that was consumed in adequate amount, 65 grams of fruits, and 96 grams of vegetables, or a combined total of 161 grams. This weight constituted 1/5 of the total food intake. Of the fruits, practically 2/3 consisted of at least 6 varieties of banana, more of "saba" and "latundan" than the others. The rest of the fruits were pineapple, alligator pear ("abokado"), watermelon, soursop, jackfruit, black plum ("duhat"), star apple, apple, curacao apple ("makopa"), melon, cacao seeds ("kakaw"), "anonas", and tamarind.

Most commonly used vegetables were eggplant, bottle gourd, bamboo shoot, cabbage, leguminous pods, green papaya, sponge gourd, bittermelon, and onion. Others used in lesser amounts were banana heart, pepper, okra, unripe jackfruit, seaweed, yam bean ("singkamas"), garlic, young coconut, ginger, sesban flower ("katuray"), tamarind leaves and flowers, mushroom, taro ("gabi") petioles, and a few others. Among the processed fruits, only canned pineapple juice was encountered, but in very small amounts.

Meat, poultry, and fish

The important foods consumed under this food group were fresh meats (35%), fresh fish (14%), canned and processed fish (30%), and crustaceans and mollusks (9%). The rest of the foods consumed under this group consisted of small amounts of organ meats (5%), dried fish (4%), beetles (2%), and canned and processed meats (1%).

Among the fresh meats, (26 grams), pork was the most com monly used (15 grams). The other meats included chicken (6 grams), carabao meat (3 grams), beef (1 gram), and fractions of a gram of deer's, horse's, dog's, duck's, bird's, and frog's meats, and beetles. Organ meats (4 grams) of the aforementioned animals included liver, heart, lungs, brain, tongue, kidney, spleen, intestines, gizzard, omassum ("librilyo") and reticulum ("mansanilya"). Canned and processed meats included pork sausage, corned beef, dried pork, luncheon meat, beef loaf, and ham (1 gram).

The fresh fish consumption (11 grams) was only 1/2 of the canned and processed fish (22 grams), and less than the meat consumption by 15 grams. A little more than half (6 grams) of the fresh fish consumption consisted of milkfish ("bangus"), mudfish ("dalag"), and leather jacket ("tilapia"). All other fishes consumed were less than 1 gram per capita per day, most common among which were catfish ("hito"), "galunggong", "bia", "dalagang-bukid", "kanduli", "espada", "albakora", and "sapsap". Among the dried fishes (3 grams) long-jawed anchovy ("dilis") and young herring ("tunsoy") were most commonly used.

The types of processed fish encountered in the survey were salted and fermented, pickled, smoked, and canned, as sardines and salmon.

Twice as much of fresh fish were consumed in the form of canned and processed fishes (22 grams), 3/4 of which were in the form of salted and fermented long-jawed anchovy ("bagoong isda"), and smaller amounts as sardines in tomato sauce, salmon, smoked scar ("galunggong", "tinapa"), salted and fermented small shrimps, fish sauce, pickled ("buro") tilapia, and others.

Among the crustaceans and mollusks, snails and clams were most commonly used; others included small and medium-sized shrimps, prawns, squids, crabs, oysters, and lobsters.

Eggs

Hen's eggs were most commonly used, 4.5 grams out of a total per capita consumption of 5 grams. The rest of the intake included fresh and fertilized duck's eggs, as well as ant's and turkey's eggs.

Milk and milk products

The milk consumption (converted to whole milk equivalent) approximated 4 and 1/2 teaspoons (22 grams) per capita per day, out of which less than 2 teaspoons were of the "filled" milk type, and a little over a teaspoon of evaporated, less than a teaspoon of condensed, 1/3 teaspoon of fresh carabao's, and 1 gram of powdered skim milk. Consumption of other types which included powdered whole, naturalized, and fresh cow's milk was less than a gram, and of milk products such as cheese and ice cream even less (.17 gram).

Fats and oils

More than 2/3 of the fat and oil consumption (6 grams, or a little over 1 teaspoon) was taken as vegetable lard and coconut oil. The rest of the fat intake, 1/2 teaspoon, included other products derived from coconut oil such as margarine, sandwich spread, and shredded coconut. Small amounts of peanut butter also showed up in the food records. Fats derived from animal sources, like pork fat and pig's cracklings, constituted a very small proportion of the total fats consumed.

Miscellaneous

Salt among the seasonings, and soft drinks and coffee among the beverages were most prominently used among the foods under this group. Other foods that were consumed in much smaller amounts were vinegar (from coconut), sugar cane, fermented palm sap, powdered cocoa, chocolate, "kakaw" fruit, liquor, "vetsin", tomato catsup, ground pepper, tea, vanilla, Chinese salted fruit ("champoy") and "kropek". While these foods do not count among those recommended and are consumed in comparatively small amounts, yet they assume a regular place in the dietary of most people.

Nutrient Intake

From the dietary evaluation, the regional diet of Cagayan Valley-Batanes region appears adequate only in iron, niacin, and ascorbic acid, to the extent of 150, 115, and 117%, respectively, of recommended allowances (Fig. 2). Incidentally, these are the same nutrients in which the Ilocos-Mountain Province diet was found adequate. Similarly, calcium and riboflavin were way down the list, 39 and 41% of recommended allowances, respectively. Intake of calories was 81% of recommended allowances, protein 87%, vitamin A 64%, and thiamine, 65%.

The distribution of the households according to how adequately they met recommended allowances of the different nutrients is shown in Table 8. Results showed that from 2/3 to 4/5 of the households had adequate intakes of iron and niacin. More than 1/2 of the households had ascorbic acid intakes from 80 to 100%, and vitamin A intakes less than 60% of recommended allowances. The median intake of calories was 74.5% of recommended allowances (midpoint of 70-79%), of protein 84.5%, and of thiamine 54.5%. Almost 3/4 of the households met less than 50% of recommended allowances for calcium and riboflavin.

Calorie and Nutrient Distribution

The calories were contributed by carbohydrates, 347 grams, fats, 25 grams, and protein, 47.7 grams. In percent of total calories, these foodstuffs contributed 78, 12, and 10% of the total calories, respectively. Of the fats, the ratio of animal to vegetable in percentage was 48 to 52%, while of the protein, this ratio was 30 to 70%. The gram equivalent of these percentages are shown in Fig. 3.

Animal protein was derived largely from "meat, poultry, and fish", so was animal fat. The rest of the fat, 1/2, was derived largely from vegetable fat (coconut oil), and 1/4 from "cereals" and grain products. Of the total fats consumed (24.8 gm), 7.7 grams (31%) consisted of visible fats, largely from pork, and coconut oil and its products. Iron and vitamin A were also largely derived from vegetable sources, the ratio of animal to vegetable in the case of iron being 29% to 71%, and in vitamin A, 11% to 89%. With regard to ascorbic acid, 73% were from cooked sources, and 27% from fresh (Fig. 3).

Table 7 shows the percentage contribution of the different food groups to calories and nutrients in the household diets under study. As usual, cereals were the principal contributors of calories (carbohydrates) and of protein, thiamine, riboflavin, and niacin. Because of their high intakes, they contributed a slightly higher percentage of iron than "meat, poultry, and fish" which are generally the major contributors of this nutrient, as they also are of calcium. In view of the low intake of "fats and oils", these foods ranked second only to "meat, poultry, and fish" as fat sources. If adequate amounts of "milk and milk products" and of "leafy and yellow vegetables" were consumed, a much higher percentage of calcium could have been contributed by these foods. The "leafy and yellow vegetables" contributed only 1/9 of the iron content of the diet, but a great percentage (59%) of the vitamin A. While all the fruits and vegetables contributed more than 80% of the ascorbic acid content of the diet, about half of this nutrient was contributed by vegetables that required cooking.

Influence of Certain Factors on Food Intakes and Diet Ratings

Food and nutrient intakes as affected by different factors like household size, household average years of schooling, per capita food expense, occupation of household head, extent of home food production, household dialect, marketers and cooks, and food storage and cooking facilities were determined. Diet ratings were computed for all the households as average percentages of adequacy with respect to calories and all the nutrients for which their diets were evaluated.

Figure 8 shows that more than half of the households had diet ratings ranging between 60 and 79%, less than 1/4 from 80 to 100%, and more than 1/4, 59% and below.

Household size. Diet ratings did not necessarily decrease with increase in household membership as Fig. 9 shows. Similarly, the amounts consumed of the different food groups did not show any definite trends even as the households increased in size. Whereas our previous surveys have shown diet ratings to decrease with increase in number of household members, such was not the case in this survey. While there was a definite decrease in diet rating from 74.5% to 67.7% with increase in household membership from 3 to 6, the reverse was true when household membership increased from 10 to over 12. The rating increased from 65.2% to 78.1%. This can probably be explained by the fact that only 7 households were involved in such increase, and can hardly constitute a basis for anything conclusive. Incidentally, the food expense of these households were examined and found to be close to P0.50 and up per capita per day, the amount being spent by the upper 1/3 of the households.

Household average years of schooling. It is generally accepted that level of schooling has a direct relationship to the diet rating, and this is shown by Fig. 10, as has also been repeatedly shown in our previous surveys. At "below 5 years" the rating was 65%, at "5-10 years" 77%, and at "over 10 years" 81%. As household years of schooling increased, so did consumption of "meat, poultry, and fish", "eggs", "whole milk", and "fats and oils", known to be the prestige foods. Recommended amounts of the first two groups were met only by the households starting at "8 years" level of schooling and higher. Of "whole milk", recommended amounts were not met even at the highest level of schooling, and "fats" only at "15 years" level of schooling. Other than "cereals", and "other fruits and vegetables", all other food groups were not met adequately, or only by a limited number of households.

Food expense. Figure 11 shows how diet ratings steadily increased from 55 to 89% with increase in per capita food expense from ten centavos (P0.10) to one peso and 29 centavos (P1.29). At one peso and thirty centavos (P1.30) and above, however, the diet rating tapered off by 7%, a finding which has been consistent with all our previous surveys. This seems to be the borderline, or the point beyond which no increase in amount of food expense will result in further improvement of the diet. Or, that no matter how much more money beyond P1.29 is spent for food, this amount is not necessarily spent for protective foods that will result in nutritionally better diets.

Recommended amounts of "meat, poultry, and fish" and "eggs" were met adequately only from 70 centavos (P0.70) up per capita food expense, but "cereals" were met adequately at all food expense levels starting at ten centavos (P0.10). Two-thirds of the households spent less than fifty centavos (P0.50) per capita per day for food, while one-third spent from 50 centavos to one peso and 49 centavos (P0.50 to P1.49).

Occupation. All occupational groups except the "professionals and related workers" met recommended allowances for "cereals". On the other hand, allowances for "meat, poultry, and fish" and "eggs" were met nearly adequately only by the occupational groups falling under the professional, managerial, administrative, office and related workers (Table 9). The highest diet ratings were obtained by these same occupational groups, by "salesmen", by the "retired" group — the "white collar" workers, ranging from 78 to 83%. The lowest diet ratings were obtained by the "manual workers and laborers" and by "farmers, fishermen, and hunters" ranging from 62 to 65%. All other occupational groups had diet ratings that ranged in-between these extremes (Fig. 13).

Home food production. Ninety-nine (99) percent of the households were engaged in some type of food production, which products included staple foods (rice, corn), vegetables, fruits, poultry, pigs, and subsistence animals. Their ratings, however, did not show any marked differences whatever product they raised. The non-food producing households had a slightly higher diet rating than the food-producing (Fig. 12).

Household dialect. The major dialects spoken included Ilocano in 69%, and Itawes in 20% of the households (Fig. 14). In view of the small number of households speaking several other dialects, the widely divergent diet ratings obtained by these households cannot be given too much credence. The wide range of diet ratings, from 51 to 79% could not necessarily have resulted from the fact that they spoke different dialects and therefore had different diet patterns.

Marketer and cook. While in the majority of the households, the housewives were the marketers and cooks, it is known that among the better provided households which in this region came up to only 9 to 12 households, a maid is usually employed to do these housewifely duties. Fig. 15 and 16 show the highest diet ratings to be in these households where the maids were the marketers and cooks (both 81%) as against the housewives, both 68%.

Food storage and cooking facilities. The highest diet ratings were obtained by the households which had the best type of facilities for storing food (Fig. 17). The households with none of these food storage facilities at all had the lowest diet rating, (58%), and those with the best, the highest (79%). Oddly enough, the only household using sawdust for cooking obtained the highest diet rating, 96%, (Fig. 18). Majority of the households were using wood for fuel, and their ratings ranked lowest (68%). Only 4 households used kerosene and had a rating of 82%.

Sources of Nutrition Information

Table 4 shows the sources of nutrition information cited by the subjects interviewed in the dietary survey. It clearly shows that only one-fourth of the survey population were being reached by personnel from the community health agencies, one-fourth relying merely on word of mouth from friends, neighbors, and relatives. One-fourth of the subjects interviewed mentioned the printed word (newspapers, magazines), teachers, and the Food and Nutrition Research Center as sources of nutrition information. The remaining one-fourth mentioned Department of Agriculture personnel, the radio, and others whose jobs involved contacts with people, not necessarily in connection with food or health.

DISCUSSION

Like the diet of the Ilocos-Mountain Province region, that of Cagayan Valley-Batanes region was a rice-and-vegetable diet, with a smattering of all the other foods considered necessary for a well-rounded and varied diet. There is a great need to improve the calorie and protein levels in the diet, which will ultimately redound to improvement in the levels of many other nutrients found deficient.

Adequacy in dietary levels of iron, niacin, and ascorbic acid is not to be regarded complacently. These nutrients are water-soluble, and the many factors influencing their absorption and utilization point to their possible shortages despite dietary levels showing otherwise. The presence of these nutrients in the foods as analyzed from food composition tables is no guarantee of their presence in the foods as consumed.

While an appreciable amount of iron was apparently present in the diet, it is not known whether the forms in which it was taken were the absorbable, as nearly all forms of food iron is in ferric form. Yet anemia particularly among mothers and children was not an uncommon observation. Under these circumstances, the question that arises is how much of the iron in the diet is biologically available, or how far is protein deficiency responsible for the anemia (10). Vitamin C helps to change iron to its ferrous form which is readily absorbable. The B-complex vitamins are useful in the treatment of anemias as they enable the body to utilize iron, but with these vitamins in short supply as they were in this diet, the dietary iron may not have been properly utilized. Many factors that influence iron utilization point to the need for a good supply of this mineral and of the nutrients that influence its absorption, for proper food preparation and cooking techniques, and for increased use of foods with easily available iron, as mature pulses and nuts, whole-grain cereals, molasses, and leafy greens, among others.

The high carbohydrate intake of the population surveyed probably justifies the high requirements for the B-complex vitamins.

Ascorbic acid was largely derived from cooked vegetables. Very little was consumed of vegetables eaten raw and of the fruits known to be important sources of this nutrient. This vitamin has many avenues of escape before actual consumption of their food sources takes place, such as careless handling, food preparation, and cooking practices.

The calorie sources in the diet can stand much improvement. The population surveyed ate more rice than recommended, and less of other carbohydrate calorie sources like starchy roots, sugars, mature pulses and nuts, and also of the sources of fat calories, the fats and oils. Rice is the usual supplier of the great bulk of the calories. Other than the fact that the cereal is filling because of its great tendency to absorb and retain moisture, it is the cheapest and most easily available contributor of calories, weight for weight, with the exception of starchy roots which have a high moisture content. Rice being the important food item that it is, it stands to reason that the best quality of rice must be recommended, that which is closest to the natural, unrefined form. As the major contributor of the B-vitamins, as well as of iron and protein, improvement in the quality of rice consumed will consequently result in improvement of these corollary nutrients, which are rather difficult to expect of other foods not taken in such large amounts as rice is.

An exception to the general pattern of high rice consumption and very little of root crops was found in the province of Batanes, from which a few households formed part of the regional sample. Here, as in isolated areas in the Mountain Province, root crops were a major food item, with the difference that in the latter, both rice and root crops, notably "kamote", were consumed in huge amounts. In Batanes, however, rice was consumed in amounts much below recommended, (one-third), and the starchy roots, notably white "kamote" and white and purple yam, were used to supply the rest of the bulk of the diet. These root crops thus made substantial contributions to the total calorie intake, supplying the bulk of the calories. This was understandable considering that Batanes is an isolated island, accessible only by plane or by cargo boat once every six months or so. It is often visited by storms, and root crops seem to be more easily available under those conditions than rice itself, which has to be imported from the mainland. Besides calories, these root crops contributed appreciably to the ascorbic acid content of the diet. The loss or destruction of this nutrient in cooking is not great particularly where cooking methods are conservative (usually boiling in their jackets) as in Batanes. For all practical purposes, it can be assumed that when the diet includes half a pound or more a day of tubers, the vitamin C intake will be adequate (14).

The proteins in the diet were largely derived from plant sources. The high prices of animal protein foods on account of their being more expensive to produce make them available only to the better educated "white collar" workers who have higher economic potential, rather than to the producers themselves who have to sell their products to buy their other needs. There is need for more dried beans, nuts, and legumes in the diet to improve the quality of the plant proteins derived from other plant sources. These foods provide the amino acids generally lacking in most plant foods, particularly lysine in which cereals are deficient. On the other hand, they are themselves supplemented by the cereals for the amino acids cystine and methionine in which they are deficient (14).

Increased use of animal foods to include those that are also good sources of calcium like the small fishes eaten whole with the bones and shell fishes, which are cheap foods, should be encouraged. A balanced mixture of plant and animal foods have more chances of containing good quality protein, iron, the B-vitamins and all the nutrients that a white rice-and-vegetable diet generally lacks. As Bigwood (1) says, "an adequately balanced diet in all nutrients is more easily obtained from mixed diets, composed of foods from both vegetables and animal origin, than it is from purely vegetarian diets alone . . . . . The problem in underdeveloped countries is therefore not only to improve the amount of calories provided in the food but also the balance of the diet by increasing the amount of available perishable foods of animal origin . . . . ."

Fats, besides acting as vehicles for the fat-soluble vitamins, also assist in the absorption of carotene. Thus, a diet that is rich in carotene may have adequate "vitamin A activity" as long as vegetable oils, devoid of such "activity" themselves, are present.

As regards calcium, which was markedly deficient in comparison to recommended allowances, the compatibility for Filipinos of these allowances which were adopted from foreign standards, has yet to be established. An abstract from a Report of an FAO/WHO Expert Group (1962) has this to say: . . . . "Most apparently healthy people, both children and adults, throughout the world develop and live satisfactorily on a dietary intake of calcium which lies between 300 mg. and over 1,000 mg. a day. There is so far no convincing evidence that, in the absence of nutritional disorders and especially when the vitamin D status is adequate, an intake of calcium even below or above these intakes is harmful. No frank signs of calcium deficiency have ever been described in any part of the world, even in populations with an habitually low calcium intake . . . ." (3).

Riboflavin also falls very much below adequacy levels in the diets. The low intakes of animal foods, particularly of milk and eggs, and of the leafy vegetables, which are important sources of this nutrient as well as of vitamin A account for such pronounced deficiencies.

Food that is eaten determines the nutritional status of the population, but poor nutrition cannot be assumed unless evidence of inadequate nutrition is available from clinical and biochemical surveys. The clinical survey should give the measure of nutriture since health, not a specific level of nutrient intake, is the goal of nutritional preventive medicine (12). The resultant health and vitality of the people are the criteria by which dietary adequacy must be finally judged rather than by a tentative yardstick of recommended nutrient allowances. According to Hollingsworth (9), Sinclair, in 1944 gave uncertainties on food composition and on human nutritional requirements as the main reasons why dietary surveys by themselves could not then "provide evidence of the extent of malnutrition". This is still true today.

SUMMARY

A dietary survey of 293 households in the Cagayan Valley-Batanes region was conducted by the Food and Nutrition Research Center, National Institute of Science and Technology, National Science Development Board, as one phase of a complete nutrition survey that also included clinical and biochemical phases. The survey sample consisted of a total of 1,814 members, or an average household size of 6.2 members. This is the fifth region (out of ten) in the country to be surveyed nutritionally, thus leaving only one region to complete the nutritional picture of Luzon Island in the Philippines.

Per capita food and nutrient intakes were compared with recommended food and nutrient allowances set as tentative yardsticks for dietary adequacy, with due consideration of the limitations of

such provisional allowances. Food intakes were found to be adequate only in cereals, specifically highly polished rice, and succulent vegetables. Such large intakes made rice the major contributor of calories, proteins and the B-vitamins, and cooked vegetables, of ascorbic acid. Only iron, niacin, and ascorbic acid met recommended standards for adequacy, but the many factors that influence their absorption and utilization in the body leave much room for doubt as to the actual status of the population surveyed with respect to these nutrients.

There was a generally low intake of the protective foods — meats, fish, eggs, milk, fruits, leafy and yellow vegetables, mature pulses, and whole-grain cereals. A rice-and-vegetable diet plus a smattering of all other foods can hardly constitute a diet that is nutritionally balanced in the different nutrients, interrelationships of which in the body are well recognized. Many social and economic factors affected the quantity and quality of the food intakes. Among these were the generally low economic status of the households and therefore their inability to buy the usually more expensive animal foods, lack of proper incentives to produce foods, low educational levels, established food habits and attitudes of long duration influenced largely by erroneous food beliefs and superstitions, absence of organized promotional programs for better nutrition, and other similar causes which an integrated community effort can help to ameliorate.

RECOMMENDATIONS

There is much that can be done in a coordinated program for improved health through better nutrition. Measures that may be recommended include the following:

1. The intensification of food production through cooperative technical assistance, concerted community effort, provision of suitable incentives, and other means that will enable food supply particularly of the protective foods, to catch up with nutritional requirements for an exploding population;

2. Improvement in the quality of our basic food, rice — through adequate implementation of the Rice Enrichment Law — if unpolished or undermilled rice cannot be had without inhibiting the population's natural craving for highly polished rice;

3. Raising educational levels through a widespread campaign for the development and extension of educational levels, because unless food producers have a certain amount of education, they

are generally out of touch with modern improvement and often resist change in the practices they have always followed;

4. Important as the education of the food producer is, so also is that of the consumer. Developing the right food attitudes and disseminating correct nutrition information through systematic educational programs should also include nutrient conservation techniques to make the best use of nutrients already within their reach but which ignorance causes them to lose unnecessarily;

5. We are not any closer now to our goal for better nutrition than we were before we became aware of the problems, but it can be reached through a cooperative nutrition program that closely integrates the activities of agriculture, health, education, rural improvement, and social welfare agencies with emphasis on maternal and child nutrition programs. Nutrition is a multifarious problem and only a concerted effort on the part of all concerned could bring us closer to that goal.

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DIETARY PHASE TABLES

Table 1. AGE AND SEX COMPOSITION OF POPULATION SAMPLE IN CAGAYAN VALLEY-BATANES REGION: April - June, 1961

SURVEYED	Number of Households	Number of Persons	0 - 12 YEARS						13 - 20 YEARS					21-60 YEARS		OVER 60	TOTAL
									GIRLS		BOYS						
			Under 1	1-3	4-6	7-9	10-12	TOTAL	13-15	16-20	13-15	16-20	TOTAL	MALES	FEMALES	MALES and FEMALES	
T O T A L	293	1814	73	183	210	167	155	808	66	89	65	90	310	306	334	56	696
BATANES	6	36	2	4	3	2	1	12	1	1	2	2	6	7	7	4	18
Basco	6	36	2	4	3	2	1	12	1	1	2	2	6	7	7	4	18
CAGAYAN	124	713	22	71	82	78	65	318	22	32	22	36	112	129	138	16	283
Amulung	41	217	9	19	26	24	21	99	6	8	7	10	31	37	46	4	87
Iguig	46	257	8	27	26	29	23	113	6	15	7	10	38	49	49	8	106
Tuao	37	239	5	25	30	25	22	106	10	9	8	16	43	43	43	4	90
ISABELA	137	873	44	90	105	88	63	390	35	47	33	43	158	140	155	30	325
Cabatuan	89	543	29	55	69	46	33	232	23	33	21	31	108	93	97	13	203
Ilagan	3	34	-	5	4	3	5	17	2	1	1	2	6	3	5	3	11
San Mateo	45	296	15	30	32	39	25	141	10	13	11	10	44	44	53	14	111
NUEVA VIZCAYA	26	192	5	18	20	19	26	88	8	9	8	9	34	30	34	6	70
Bayombong	26	192	5	18	20	19	26	88	8	9	8	9	34	30	34	6	70

Table 2. SIZE OF HOUSEHOLDS WITH AGE DISTRIBUTION IN 293 HOUSEHOLDS SURVEYED CAGAYAN VALLEY-BATANES REGION: April-June, 1961

SIZE OF HOUSEHOLDS	NUMBER OF HOUSEHOLDS	NUMBER OF PERSONS	AGE GROUP							
			0-12 years		13-20 years		21-60 years		over 60 years	
			No.	%	No.	%	No.	%	No.	%
TOTAL	239	1814	808	44.5	310	17.1	640	35.3	56	3.1
1	-	-	-	-	-	-	-	-	-	-
2	16	32	1	3.1	4	12.5	20	62.5	7	21.9
3	23	69	13	18.8	10	14.5	42	60.9	4	5.8
4	33	132	38	28.8	24	18.2	62	46.9	8	6.1
5	51	255	108	42.4	35	13.7	102	40.0	10	3.9
6	57	342	172	50.3	42	12.3	123	35.9	5	1.5
7	36	252	114	45.2	50	19.9	82	32.5	6	2.4
8	29	232	110	47.4	45	19.4	72	31.0	5	2.2
9	18	162	81	50.0	30	18.5	46	28.4	5	3.1
10	12	120	65	54.2	23	19.2	32	26.7	-	-
11	10	110	53	48.2	25	22.7	30	27.3	2	1.8
12	1	12	6	50.0	4	33.3	2	16.7	-	-
13	4	52	28	53.9	10	19.2	14	26.9	-	-
14	2	28	12	42.9	5	17.9	8	28.5	3	10.7
15	-	-	-	-	-	-	-	-	-	-
16	1	16	7	43.7	3	18.7	5	31.3	1	6.3

Table 3. PERCENTAGE BREAKDOWN OF THE SURVEY POPULATION BY AGE, SEX AND PHYSICAL ACTIVITY IN CAGAYAN VALLEY-BATANES REGION:

April-June, 1961

Age, Sex and Physical Activity	Number of Persons	Per Cent	Total Per-Cent By Group
Total	1814	100.00	100.00
Man			
Sedentary	42	2.32	18.42
Moderately Active	56	3.09	
Very Active	236	13.01	
Woman			
Sedentary	40	2.21	20.56
Moderately Active	145	7.99	
Very active	53	2.92	
Pregnancy	34	1.87	
Lactation	101	5.57	
Children Up To 12 Years			
Under 1 year	73	4.02	44.54
1 - 3 Years	183	10.09	
4 - 6 Years	210	11.58	
7 - 9 Years	187	10.31	
10 - 12 Years	155	8.54	
Children Over 12 Years:			
Girls: 13 - 15 years	66	3.64	16.48
16 - 20 years	78	4.30	
Boys: 13 - 15 years	65	3.58	
16 - 20 years	90	4.96	
TOTAL HOUSEHOLDS	293		
AVERAGE HOUSEHOLD SIZE	6.2		

Table 4. SOURCES OF NUTRITION INFORMATION [1/] IN CAGAYAN VALLEY-BATANES REGION: April-June, 1961

SOURCE OF INFORMATION	NUMBER	PERCENT
TOTAL [2/]	636	100.00
Health or puericulture center, family physician or nurse	166	26.1
Friends, neighbors, and relatives	151	23.7
Books, magazines or periodicals	61	9.6
School teachers or other school personnel	54	8.5
Food and Nutrition Research Center (former Institute of Nutrition)	51	8.0
Will wait for a chance to ask someone	48	7.6
Home demonstrators or other workers of the Department of Agriculture	37	5.8
No response	30	4.7
Radio	22	3.5
Others (Herbolaryo, authorities on food, sanitary inspector, not specified, etc.)	16	2.5

[1/] Total number of subjects surveyed 299

[2/] These refer to number of enumerations rather than number of respondents, since more than one source was given by some.

Table 5. AVERAGE DAILY PER CAPITA FOOD GROUP INTAKES IN 293 HOUSEHOLDS IN CAGAYAN VALLEY-BATANES REGION: April - June, 1961

FOOD GROUP	INTAKE (Gms.) As Purchased	INTAKE (Gms.) Edible Portion	Percent of Total Food Intake
TOTAL	907.25	780.34	100.00
I. Cereals	350.45	348.57	44.67
Rice and rice products	267.45	267.45	34.27
Other cereals	83.00	81.12	10.40
II. Starchy Roots and Tubers	55.55	47.30	6.06
III. Sugars and Syrups	20.31	20.31	2.60
IV. Dried Beans, Nuts and Seeds	13.61	13.41	1.72
V. Leafy and Yellow Vegetables	38.14	24.13	3.09
VI. Vitamin C-Rich Foods	47.99	37.41	4.80
Tomatoes	12.41	11.91	1.53
Vitamin C-rich fruits	35.58	25.50	3.27
VII. Other Fruits and Vegetables	222.31	161.38	20.68
Other fruits	107.72	65.03	8.33
Other vegetables	114.13	95.89	12.29
Canned and processed fruits	.46	.46	.06
VIII. Meat, Poultry and Fish	105.33	74.96	9.61
Fresh meats	25.08	20.17	2.59
Organ meats	3.57	3.57	.46
Canned and processed meats	.87	.86	.11
Poultry	9.63	6.30	.81
Fresh fish	20.71	10.80	1.38
Dried fish	4.45	2.74	.35
Canned and processed fish	22.70	22.07	2.83
Crustaceans and Mollusks	16.54	7.01	.90
Others: Beetles	1.78	1.44	.18
IX. Eggs	5.71	5.02	.64
X. Milk and Milk Products	22.12	22.12	2.83
Whole milk	21.95	21.95	2.81
Milk products	.17	.17	.02
XI. Fats and Oils	8.32	8.32	1.07
Fats and oils	7.83	7.83	1.01
Fats from grated coconuts	.49	.49	.06
XII. Miscellaneous	17.41	17.41	2.23

Table 6. ITEMIZED PER CAPITA FOOD INTAKES
IN 293 HOUSEHOLDS IN CAGAYAN VALLEY-BATANES REGION:
April-June, 1961

FOOD ITEM		INTAKE (grams)		Percent of Food Group	Percent of Total Food Intake
ENGLISH NAME	COMMON NAME	At Purchased	Edible Portion		
	TOTAL	907.25	780.34	100.00	
I. CEREALS		350.45	348.57	100.00	44.67
Rice and rice products	Bigas	267.45	267.45	76.73	
Rice, polished		241.04	241.04	69.15	
Rice, unpolished		14.30	14.30	4.10	
Rice, glutinous	Malagkit	6.61	6.61	1.90	
Rice products such as:		5.50	5.50	1.58	
Glutinous rice cakes	Suman, ibus, lihiya, marwekos	(2.01)	(2.01)	(.58)	
Rice cakes & other rice preparation	Puto maya, siopao, biko, kalamay, puto, bibingka, malagkit, bitso-bitso, kutsinta gurguria, palitao, baduya, tuhog-tuhog, bola-bola, carioca	(2.39)	(2.39)	(.69)	
Rice noodles, cooked and raw	Pancit bihon, tuyo at guisado, sutanghon	(.70) (.11)	(.70) (.11)	(.20) (.03)	
Rice flour	Rice coffee, galapong	(.21)	(.21)	(.06)	
Poprice	Ampaw	(.08)	(.08)	(.02)	
Other Cereals		83.00	81.12	23.27	
Corn	Mais	73.73	71.85	20.61	
white & yellow ground		(70.62)	(70.62)	(20.[illegible]5)	
white & yellow in cobs		(2.94)	(1.06)	(.30)	
popcorn		(.07)	(.07)	(.02)	
corn flour		(.06)	(.06)	(.02)	
corn used as coffee		(.04)	(.04)	(.01)	
Bread		3.79	3.79	1.09	
	Pan de sal, monay	(3.21)	(3.21)	(.92)	
	de leche, de coco	(.53)	(.53)	(.15)	
	de limon, de agua	(.05)	(.05)	(.02)	
Wheat noodles, cooked and raw		2.53	2.53	.73	
	Pancit miko, guisado	(1.27)	(1.27)	(.36)	
	Miko	(1.07)	(1.07)	(.31)	
	Misua	(.19)	(.19)	(.06)	
Bakery products as cookies, biscuits, wafers, toasted bread		1.69	1.69	.48	
	Crackers, biscuits, wafers	(1.07)	(1.07)	(.31)	
	Jacobina, biskotso	(.42)	(.42)	(.12)	
	Pilipit, ensaymada	(.19)	(.19)	(.05)	
	Gurguria, galyetas at apa	(.01)	(.01)	-	
Plain cake, banana cake	Mamon	.50	.50	.14	
American loaf	Pan Americano	.47	.47	.13	
Noodle soup, macaroni		.13	.13	.04	
Flour, all-purpose	Arina	.08	.08	.02	
Quaker oats		.06	.06	.02	
Stuffed bakery product with mung bean	Hopia, munggo	.02	.02	.01	

FOOD ITEM		INTAKE (grams)		Per cent of Food Group	Percent of Total Food Intake
ENGLISH NAME	COMMON NAME	As Purchased	Edible Portion		
II. STARCHY ROOTS and TUBERS		55.55	47.30	100.00	6.06
Sweet potato, white	Kamote, puti	21.56	18.54	39.20	
Yam, violet	Ubi	17.95	15.26	32.26	
Yam, white	Tugi	8.47	7.20	15.22	
Taro	Gabi	3.07	2.52	5.33	
Sweet potato, yellow	Kamote, dilaw	2.63	2.26	4.78	
Potatoes	Patatas	1.05	.89	1.88	
Cassava	Kamoteng-kahoy	.79	.60	1.27	
Sweetened tubers	"Halo-halo"	.03	.03	.06	
III. SUGARS and SYRUPS		20.31	20.31	100.00	2.60
Sugar, brown	Asukal	11.36	11.36	55.93	
Sugar, white		7.43	7.43	36.58	
Sugar, crude		.40	.40	1.97	
Cane, molasses	Pulot	.60	.60	2.95	
Shredded coconut, sweetened		.41	.41	2.02	
Hard candy		.06	.06	.30	
Pineapple jam		.03	.03	.15	
Caramel		.01	.01	.05	
Sweet peanuts (candy)		.01	.01	.05	
IV. DRIED BEANS, NUTS and SEEDS		13.61	13.41	100.00	1.72
Mung bean	Munggo	6.28	6.28	46.83	
Mung bean, green	Munggo, berde	(5.95)	(5.95)	(44.37)	
Mung bean, yellow	Munggo, dilaw	(.25)	(.25)	(1.86)	
Mung bean, sauted	Munggo, guisado	(.08)	(.08)	(.60)	
Cowpeas, beans	Paayap, buto	3.59	3.59	26.77	
Beans, white, red, black	Buto	1.51	1.51	11.26	
	puti, pula	(1.37)	(1.37)	(10.22)	
	itim	(.14)	(.14)	(1.04)	
Peanuts	Mani	1.13	.93	6.94	
Dried peanuts with or without shell		(.51)	(.35)	(2.61)	
Roasted peanuts used as coffee		(.28)	(.23)	(2.09)	
Peanuts, roasted without shell		(.23)	(.23)	(1.72)	
Boiled peanuts		(.09)	(.06)	(.45)	
Peanuts, roasted with shell		(.02)	(.01)	(.07)	
Soybean products such as:		.63	.63	4.70	
Soy sauce	Toyo	(.44)	(.44)	(3.28)	
Soybean used as coffee		(.10)	(.10)	(.75)	
Fermented soybean	Tausi	(.07)	(.07)	(.52)	
Soybean curd	Tokwa	(.02)	(.02)	(.15)	
Lima beans	Patani, lamkampilan	.27	.27	2.01	
Jackfruit seeds	Langka, buto	.08	.08	.60	
Peas, canned and dried	Guisantes	.07	.07	.52	
Pigeon pea	Kadyos	.05	.05	.37	

FOOD ITEM		INTAKE (grams)		Percent of Food Group	Percent of Total Food Intake
ENGLISH NAME	COMMON NAME	As Purchased	Edible Portion		
V. LEAFY and YELLOW VEGETABLES		38.14	24.13	100.00	3.09
Squash, fruit, leaves and flowers		11.42	7.65	31.70	
	Kalabasa, bunga	(10.06)	(6.94)	(28.76)	
	Kalabasa, dahon	(.85)	(.41)	(1.70)	
	Kalabasa, bulaklak	(.51)	(.30)	(1.24)	
Swamp cabbage	Kangkong	8.99	6.02	24.95	
"Horse radish" tree	Malunggay, dahon	4.52	2.89	11.98	
Taro leaves	Gabi, dahon	.35	.27	1.12	
Sweet potato young leaves	Kamote, talbos	2.96	2.16	8.95	
Bitter melon leaves	Ampalaya, dahon	1.98	.97	4.02	
Jute	Saluyot, dahon	2.19	.79	3.27	
(- - - - -)	Kubay, dahon	.76	.51	2.11	
Chinese cabbage	Petsay	.51	.42	1.74	
Yard long bean, leaves	Sitaw, talbos	.89	.42	1.74	
Malabar nightshade	Alugbati	.34	.34	1.41	
Spineless amaranth	Kulitis	.70	.33	1.37	
(- - - - -)	Kalunay, dahon	.63	.32	1.33	
(- - - - -)	Alllay	.36	.18	.75	
Onion leaves	Sibuyas, mura	.25	.17	.70	
Chili pepper leaves	Sili labuyo, dahon	.36	.15	.62	
Mustard	Mustasa	.12	.11	.46	
(- - - - -)	Himbabao, alokon	.20	.09	.37	
Fern	Pako	.15	.09	.37	
Cowpeas leaves	Paayap, dahon	.13	.06	.25	
(- - - - -)	Papait, dahon	.08	.04	.17	
Turpeth root, young leaves	Kamoti-kamotihan	.08	.03	.13	
(- - - - -)	Kwantung	.04	.03	.13	
Watercress	"Watercress"	.04	.02	.08	
(- - - - -)	Lanut, dahon	.03	.02	.08	
Celery chinese	Kintsay	.03	.02	.08	
Sponge gourd leaves	Patola, talbos	.01	.01	.04	
Leek	Kutsay	.01	.01	.04	
(- - - - -)	Alibangbang	.01	.01	.04	
VI. VITAMIN C-RICH FOODS		47.99	37.41	100.00	4.79
Tomatoes	Kamatis	12.41	11.91	31.84	
Vitamin C-rich fruits		35.58	25.50	68.16	
Mango, ripe	Mangga, hinog	16.70	12.06	32.23	
	Mangga, Kalabaw	(14.82)	(10.82)	(28.92)	
	Mangga, piko	(1.88)	(1.24)	(3.31)	
Papaw ripe and half-ripe	Papaya, hinog at manibalang	7.51	5.71	15.26	
Mango, unripe and half-ripe	Mangga, hilaw at manibalang	5.70	3.97	10.62	
	Mangga, kalabaw	(5.03)	(3.47)	(9.28)	
	Mangga, piko	(.67)	(.50)	(1.34)	
Pomelo	Suha	2.32	1.44	3.85	
Spanish plum	Sineguwelas	1.78	1.19	3.13	
Guavas white	Bayabas	.40	.40	1.07	
Carristel, tiesa	Tiesa	.33	.24	.64	
Lime	Dayap	.27	.16	.43	
Carambola	Balimbing	.10	.09	.24	
Orange Sunkist	"Sunkist"	.14	.08	.21	
(- - - - -)	Kalamansi	.15	.06	.16	
Mandarin	Dalanghita	.07	.04	.11	
(- - - - -)	Datiles	.03	.03	.08	
(- - - - -)	Katuyaw	.06	.02	.05	
Astec Kamochili	Kamatsili	.02	.01	.03	

N.B. (- - - - - - -) means no equivalent name in English.

FOOD ITEM		INTAKE (grams)		Percent of Food Group	Percent of Total Food Intake
ENGLISH NAME	COMMON NAME	As Purchased	Edible Portion		
VII. OTHER FRUITS and VEGETABLES		222.31	161.38	100.00	20.68
Other Fruits		107.72	65.03	40.29	
Banana	Saging	62.49	39.85	24.69	
	Saba	(30.32)	(16,98)	(10.52)	
	Latundan	(19.09)	(14.32)	(8.87)	
	Lakatan	(5.17)	(3.57)	(2.21)	
	Bungulan	(4.72)	(3.02)	(1.87)	
	Gloria	(2.39)	(1.41)	(.87)	
	Morado	(.80)	(.55)	(.34)	
Pineapple, fresh	Pinya	19.19	11.13	6.90	
Avocado, green and red		6.13	3.82	2.37	
	Abokado, berde	(4.43)	(2.70)	(1.67)	
	Abokado, pula	(1.70)	(1.12)	(.70)	
Watermelon	Pakwan	6.00	3.72	2.31	
Soursop	Guwayabano	3.07	2.15	1.33	
Jackfruit	Langka, hinog	6.08	1.52	.94	
(- - - - -)	Bignay	1.29	.63	.39	
(- - - - -)	Santol	.93	.51	.32	
Black plum	Duhat	.67	.46	.29	
Starapple, green	Kaimito, berde	.50	.34	.21	
Apple, green and red		.33	.25	.15	
	Mansanas, berde	(.30)	(.23)	(.14)	
	Mansanas, pula	(.03)	(.02)	(.01)	
Curacao apple	Makopa	.20	.16	.10	
Melon, cantaloupe	Milon	.22	.15	.09	
Spanish	Milon, kastila	(.11)	(.07)	(.04)	
	Milon, tagalog	(.11)	(.08)	(.05)	
Cacao	Kakaw	.25	.13	.08	
Papaw, half-ripe	Papaya, manibalang	.16	.09	.06	
(- - - - -)	Karamay	.04	.04	.02	
Anonas	Anonas	.09	.04	.02	
Tamarind, ripe and green	Sampalok	.05	.02	.01	
(- - - - -)	Pagut, lipoti	.03	.02	.01	
Other Vegetables:		114.13	95.69	59.42	
Eggplant	Talong	25.66	22.84	14.15	
Bottle gourd	Upo	14.39	12.09	7.49	
Bamboo shoot	Labong, kawayan	10.16	10.16	6.30	
Bamboo shoot, raw	Labong, hilaw	(6.88)	(6.88)	(4.26)	
Bamboo shoot, half-cooked	Labong	(3.25)	(3.25)	(2.02)	
Bamboo shoot, dried	Labong, tuyo	(.03)	(.03)	(.02)	
Cabbage	Repolyo	8.66	7.10	4.40	
Leguminous pods		8.90	6.78	4.20	
Yard long bean	Sitaw, berde	(3.81)	(3.47)	(2.15)	
	Sitaw, puti	(.47)	(.44)	(.27)	
	Sitaw, morado	(.08)	(.07)	(.04)	
Horse radish pod	Malunggay, bunga	(2.71)	(1.30)	(.81)	
Cowpeas beans	Paayap	(1.20)	(.90)	(.56)	
Baguio beans	Abitsuwelas	(.52)	(.49)	(.30)	
Goa or winged bean	Sigarilyas	(.03)	(.08)	(.05)	
Sweet pea	Sitsaro	(.03)	(.03)	(.02)	
Lima beans	Patani	(.002)	(.002)	(.001)	
Pawpaw, unripe	Papaya, hilaw	8.82	6.70	4.15	
Sponge gourd	Patola	8.21	6.40	3.97	
Bitter melon	Ampalaya	6.62	5.36	3.32	
Onion	Sibuyas	5.33	4.78	2.96	
	Sibuyas, bombay	(3.92)	(3.61)	(2.24)	
	Sibuyas, tagalog	(1.41)	(1.17)	(.72)	

FOOD ITEM		INTAKE (grams)		Percent of Food Group	Percent of Total Food Intake
ENGLISH NAME	COMMON NAME	As Purchased	Edible Portion		
Banana heart	Puso ng saging	4.58	3.02	1.87	
Pepper	Sili	2.11	1.99	1.24	
	Sili, mahaba	(1.99)	(1.89)	(1.17)	
	Sili, pula	(.11)	(.09)	(.06)	
	Sili, labuyo	(.01)	(.01)	(.01)	
	Sili, berde	(.004	(.003)	(.002	
Okra	Okra	1.00	.91	.57	
Jackfruit, unripe	Langka, hilaw	1.48	.89	.55	
Seaweed	Balbalulang	.64	.64	.40	
Seaweed	Kulot	.002	.002	.002	
Yam bean	Singkamas	.70	.60	.37	
Garlic	Bawang	.55	.49	.30	
(- - - - -)	Kamias	.36	.36	.22	
(- - - - -)	Karamay (kamias)	.08	.08	.05	
Wax gourd	Tangkey (kundol)	.64	.49	.30	
Breadfruit, unripe	Rimas, hilaw	.51	.34	.21	
Young coconut	Buko	.43	.24	.15	
Ginger	Luya	.32	.24	.15	
(- - - - -)	Himbabao, bulaklak	.27	.21	.13	
Sesban flower	Katuray, bulaklak	.18	.15	.09	
Tamarind leaves & Tamarind, flower	Sampalok, talbos at Sampalok, bulaklak	.10	.08	.05	
Watermelon, immature	Pakwan, mura	.11	.07	.04	
Mushroom	Kabuti	.07	.07	.04	
Carambola	Balimbing	.05	.04	.03	
(- - - - -)	Kakawate, bulaklak	.05	.04	.03	
(- - - - -)	Ligmay (used for sinigang)	.02	.01	.01	
Taro, petioles	Gabi, tangkay	2.76	2.35	1.46	
Cooked Vegetables: Eggplant, bottle-gourd, onion, cabbage, bittermelon, yard long bean, tomatoes, garlic	Talong, upo, sibuyas repolyo, ampalaya, sitaw, kamatis at bawang	.36	.36	.22	
Canned and Processed Fruits					
Pineapple juice		.46	.46	.29	
VIII. MEAT, FISH and POULTRY		105.33	74.96	100.00	9.61
Fresh Meat		34.71	26.47	35.31	
Pork	Baboy	20.05	15.38	20.52	
Pork, medium fat	Baboy, liempo sa hulihan	(13.76)	(10.32)	(13.77)	
Pork, feet	Baboy, pata	(1.92)	(1.15)	(1.53)	
Pork, lean	Baboy, lomo	(.99)	(.99)	(1.32)	
Pork, spare rib	Baboy, tadyang	(.91)	(.68)	(.91)	
Pork, plate fat	Baboy, liempo sa tiyan	(.65)	(.65)	(.87)	
Pork, head	Baboy, ulo	(.87)	(.65)	(.87)	
Pork, ham	Baboy, pigi	(.61)	(.61)	(.81)	
Pork, shoulder	Baboy, paypay	(.15)	(.15)	(.20)	
Pork, fat back	Baboy, likod	(.07)	(.07)	(.09)	
Pork, center loin	Baboy, tagiliran	(.05)	(.05)	(.07)	
Pork, ground	Baboy, giniling	(.04)	(.04)	(.05)	
Pork, tail	Baboy, buntot	(.03)	(.02)	(.03)	

FOOD ITEM		INTAKE (grams)		Percent of Food Group	Percent of Total Food Intake
ENGLISH NAME	COMMON NAME	As Purchased	Edible Portion		
Chicken		9.51	6.18	8.24	
Chicken, whole	Manok, buo	(6.38)	(3.83)	(5.11)	
Chicken, white meat	Manok, pitso	(1.65)	(1.24)	(1.65)	
Chicken, legs and wings	Manok, hita at pakpak	(1.48)	(1.11)	(1.43)	
Carabao's meat	Kalabaw	3.10	2.99	3.99	
Carabao, shank	Kalabaw, bias	(.45)	(.34)	(.45)	
Carabao, round	Kalabaw, hita	(2.54)	(2.54)	(3.39)	
Carabao, rump	Kalabaw, tapadera	(.11)	(.11)	(.15)	
Beef:		1.17	1.04	1.39	
Beef, rib roast	Baka, kadera	(.25)	(.15)	(.20)	
Beef, med, fat	Baka, paypay	(.81)	(.81)	(1.03)	
Beef, (cow's plate)	Baka, tadyang	(.11)	(.08)	(.11)	
Deer's meat	Karnong usa	.24	.24	.32	
Horse's meat	Karnong kabayo	.21	.21	.28	
Dog's meat	Karneng aso	.13	.13	.17	
Duck's meat	Karnong pato	.06	.06	.08	
Bird's meat	Karnong ibon	.06	.06	.08	
Frog's meat	Karnong palaka	.003	.003	-	
Cooked meat:	Baboy (dinuguan)	.18	.18	.24	
Organ Meat		3.57	3.57	4.76	
Pork:	Baboy	.99	.99	1.32	
Pork, liver	Baboy, atay	(.56)	(.56)	(.75)	
Pork, heart	Baboy, puso	(.15)	(.15)	(.20)	
Pork, lungs	Baboy, baga	(.12)	(.12)	(.16)	
Pork, brain	Baboy, utak	(.07)	(.07)	(.09)	
Pork, tongue	Baboy, dila	(.03)	(.03)	(.04)	
Pork, kidney	Baboy, bato	(.03)	(.03)	(.04)	
Pork, spleen	Baboy, lapay	(.02)	(.02)	(.03)	
Pork, large intestine	Baboy, bituka, malaki	(.01)	(.01)	(.01)	
Carabao, pork and chicken blood	Dugo, kalabaw, baboy at manok	.87	.87	1.16	
Chicken		.72	.72	.96	
Chicken, small intestine	Manok, bituka, maliit	(.32)	(.32)	(.43)	
Chicken, gizzard	Manok, balunbalunan	(.22)	(.22)	(.29)	
Chicken, liver, heart	Manok, atay at puso	(.18)	(.18)	(.24)	
Carabao		.54	.54	.72	
Carabao, liver	Kalabaw, atay	(.24)	(.24)	(.32)	
Carabao, omasum	Kalabaw, librilyo	(.17)	(.17)	(.23)	
Carabao, small intestine	Kalabaw, bituka, maliit	(.05)	(.05)	(.07)	
Carabao, lungs	Kalabaw, baga	(.04)	(.04)	(.05)	
Carabao, heart	Kalabaw, puso	(.02)	(.02)	(.036)	
Carabao, reticulum	Kalabaw, mansanilya	(.02)	(.02)	(.026)	
Beef	Baka	.23	.23	.31	
Beef, omasum	Baka, librilyo	(.12)	(.12)	(.16)	
Beef, liver	Baka, atay	(.06)	(.06)	(.08)	
Beef, small intestine	Baka, bituka, maliit	(.04)	(.04)	(.053)	
Beef, kidney	Baka, bato	(.01)	(.01)	(.013)	

FOOD ITEM		INTAKE (grams)		Percent of Food Group	Percent of Total Food Intake
ENGLISH NAME	COMMON NAME	As Purchased	Edible Portion		
Dog	Aso	.043	.043	.05	
Dog, lungs	Aso, baga	(.02)	(.02)	(.03)	
Dog, small intestine	Aso, bituka, maliit	(.01)	(.01)	(.01)	
Dog, liver	Aso, atay	(.01)	(.01)	(.01)	
Dog, heart	Aso, puso	(.003)	(.003)	(.00)	
Duck's liver	Pato, atay	.02	.02	.03	
Cooked organ meat	Dinuguan	.16	.16	.21	
Canned and Processed Meat		.87	.86	1.15	
Sausage, pork	Langonisa, baboy	.28	.27	.36	
Corned beef		.22	.22	.30	
Dried meat, pork	Tapa	.18	.18	.24	
Luncheon meat, beef loaf		.12	.12	.16	
Dried pork ribs	Baboy, tapa	.06	.06	.08	
Ham	Hamon	.01	.01	.01	
Fresh Fish		20.71	10.80	14.41	
Milkfish	Bangus	4.72	3.21	4.23	
Mudfish	Dalag	2.09	1.34	1.79	
Leather jacket	Tilapia, gurami	4.03	1.29	1.72	
Catfish, fresh water	Hito	1.29	.90	1.20	
Scar	Galonggong	1.83	.75	1.00	
Flat-headed goby	Bia	1.85	.72	.96	
Golden caesio	Dalagang bukid	1.16	.57	.76	
Catfish	Kanduli	1.02	.54	.72	
Yellow-finned tuna	Albakora	.35	.27	.36	
Hairtail	Espada, bulongunos	.45	.25	.34	
Grunt silver	Ayungin	.38	.17	.23	
Common slip mouth	Sapsap	.35	.11	.15	
Long-finned mullet	Banak	.15	.10	.13	
Small-scaled flying fish	Bulador	.16	.10	.13	
Tuna, bonito	Tulingan	.16	.09	.12	
Striped mackerel	Alumahan	.11	.07	.09	
Long-jawed anchovy	Dilis, malaki, banamban	.09	.07	.09	
Indian sardine	Tamban	.12	.06	.08	
Short-bodied mackerel	Mataan, hasa-hasa	.08	.04	.06	
Banded cavalla	Talakitok	.06	.03	.04	
Yellow-fin tuna	Bahoyo, tambakol	.02	.02	.03	
Fimbriated herring	Tuncoy	.03	.02	.03	
Climbing perch	Martiniko	.02	.01	.01	
Plain croaker	Alakaak	.02	.01	.01	
Threadfish	Kugaw, mamale	.17	.06	.08	
Dried Fish		4.45	2.74	3.66	
Long-jawed anchovy	Dilis	.89	.89	1.19	
Young herring	Tunsoy, lapad	.75	.45	.60	
Small-scaled flying fish	Bulador	.42	.19	.25	
Scar	Galonggong	.29	.18	.24	
Leather jacket	Tilapia	.36	.16	.21	
Flat-headed goby	Bia	.31	.14	.19	
Indian sardines	Tamban	.30	.13	,17	
Short-bodied mackerel	Hasa-hasa, mataan	.16	.09	.12	
Golden caesio	Dalagang bukid	.12	.08	.10	
Sea catfish	Idik, bongoan	.11	.05	.07	
Ribbon-finned nemipterid	Tulis,(bisugo)	.08	.04	.05	
Grunt silver	Ayungin	.08	.04	.06	
Ribbon-finned nemipterid	Bisugo	.08	.04	.05	
Black-finned mullet	Talilong	.09	.03	.04	

FOOD ITEM		INTAKE (grams)		Percent of Food Group	Percent of Total Food Intake
ENGLISH NAME	COMMON NAME	As Purchased	Edible Portion		
Banded cavalla	Talakitok	.04	.03	.04	
Striped mackerel	Alumahan	.04	.02	.03	
Spanish mackerel	Tawilis	.04	.02	.03	
Scad, big-eyed	Matang baka	.03	.02	.03	
Mudfish	Dalag	.04	.02	.03	
Tuna, bonito	Tulingan	.04	.02	.05	
Goby, long	Talimusak	.02	.02	.03	
Milkfish	Bangus	.03	.02	.03	
Ribbon-finned nemipterid, leather jacket, catfish, whiting, common slip mouth (consumed as .01 gm or less each)	Bisugo, gurami, hito, asohos, sapsap, hangos, kalaso, tamban	.13	.06	.08	
Canned & Processed Fish		22.70	22.07	29.44	
Long-jawed anchovy, fermented	Bagoong isda	16.56	16.56	22.09	
Sardines with tomato sauce	Sardinas	2.84	2.84	3.79	
Salmon		.94	.94	1.25	
Smoked scad	Galonggong, tinapa	.93	.56	.75	
Goby, fry, salted and fermented	Bagoong ipon	.44	.44	.59	
Fish sauce	Patis	.40	.40	.53	
Spanish sardines in oil	Sardinas	.25	.08	.11	
Fermented leather jacket	Burong tilapia	.08	.08	.11	
Smoked fimbriated herring	Tunsoy, tinapa	.12	.07	.09	
Spanish sardines	Sardinas	.05	.05	.07	
Smoked black-finned mullet	Talilong, tinapa	.05	.03	.04	
Smoked, short-bodied mackerel	Hasa-hasa, tinapa	.02	.01	.01	
Smoked, indian sardine	Tamban, tinapa	.02	.01	.01	
Smoked fresh water herring	Tawilis, tinapa	.002	.001	-	
Crustaceans & Mollusks		16.54	7.01	9.35	
Snails	Siok, suso, bukasit, agurong, bisukol	6.07	2.79	3.72	
Clam	Tulya, tocmon, kabibi	7.67	2.43	3.24	
Small shrimp, salted and fermented	Bagoong alamang	.35	.35	.47	
Small, fresh water shrimp	Tagunton	.33	.33	.44	
Shrimp, medium	Hipon, suahe	.44	.28	.38	
Squid, canned	Pusit	.28	.28	.38	
Tiger prawn	Sugpo	.24	.15	.20	
(-----------)	Paros	.23	.14	.19	
Small crabs	Talangka, agatul	.16	.07	.09	
Shrimps, dried	Hibe	.07	.07	.09	
Oyster	Talaba	.58	.07	.09	
Crab	Alimango	.10	.04	.05	
Small shrimp, dried	Alamang, tuyo	.01	.01	.01	
Lobster	Ulang	.006	.003	-	
Others: Beetles	Salagubang	1.78	1.44	1.92	

FOOD ITEM		INTAKE (grams)		Percent of Food Group	Percent of Total Food Intake
ENGLISH NAME	COMMON NAME	As Purchased	Edible Portion		
IX. EGGS		5.71	5.02	100.00	.64
Hen's, fresh	Itlog, manok	5.16	4.54	90.44	
Duck's, fresh	Itlog, pato	.33	.29	5.73	
Duck's, fertilized	Balut	.16	.13	2.58	
Ant's egg	Itlog, langgam	.05	.05	1.00	
Turkey's egg	Itlog, pabo	.01	.01	.20	
X. MILK and MILK PRODUCTS		22.12	22.12	100.00	2.84
Milk (converted to whole milk)	Gatas	21.95	21.95	99.23	
Filled		8.55	8.55	38.66	
Evaporated		6.07	6.07	27.44	
Condensed milk		3.84	3.84	17.36	
Fresh carabao's milk		1.58	1.58	7.14	
Powdered skimmed		1.08	1.08	4.88	
Powdered, whole		.54	.54	2.44	
Cow's milk, naturalized		.21	.21	.95	
Cow's milk, fresh		.08	.08	.36	
Milk Products		.17	.17	.77	
Kraft cheese	Keso	.08	.08	.36	
Ice cream	Sorbetes	.07	.07	.31	
Custard	Letse plan	.01	.01	.05	
Popsicle		.01	.01	.05	
XI. FATS and OILS		8.32	8.32	100.00	1.07
Vegetable lard	Mantika	3.05	3.05	36.66	
Coconut oil	Langis ng niyog	2.97	2.97	35.70	
Pork fat, lard	Mantikang baboy	1.43	1.43	17.19	
Fat from coconut		.49	.49	5.89	
Margarine		.20	.20	2.40	
Pig's crackling	Sitsaron, baboy	.08	.08	.96	
Sandwich spread		.05	.05	.60	
Peanut butter		.03	.03	.36	
Coconut shredded, unsweetened	Latik	.02	.02	.24	
XII. MISCELLANEOUS		17.41	17.41	100.00	2.23
Salt	Asin	6.58	6.58	39.79	
Soft drinks		4.81	4.81	27.63	
Coffee	Kape	3.61	3.61	20.73	
Coffee, ground	Kape, giniling	(3.58)	(3.58)	(20.56)	
Coffee, instant		(.03)	(.03)	(.17)	
Vinegar, coconut	Suka, niyog	1.45	1.45	8.33	
Sugar cane	Tubo	.35	.35	2.01	
Fermented palm sap	'Basi & tuba	.03	.03	.17	
Cocoa, powdered	Kakaw, pulbos	.20	.20	1.15	
Chocolate	Tsokolate	.06	.06	.34	
Chocolate, sweetened		(.04)	(.04)	(.23)	
Chocolate unsweetened		(.02)	(.02)	(.11)	
Chocolate, candy		.05	.05	.29	
Cocao fruit		.05	.05	.29	
Liquor		.04	.04	.23	
Vetsin		.04	.04	.23	
Catsup tomato		.04	.04	.23	
(- - - - -)	Titina	.02	.02	.11	

FOOD ITEM		INTAKE (grams)		Percent of Food Group	Percent of Total Food Intak
ENGLISH NAME	COMMON NAME	As Purchased	Edible Portion		
Pepper ground	Paminta	.02	.02	.11	
Tea	Tea	.01	.01	.06	
Vanilla		.01	.01	.06	
(- - - - -)	Gulaman	.01	.01	.06	
Malted milk, powdered		.01	.01	.06	
Chinese salted fruit	Tsampoy	.01	.01	.06	
Kropek	Kropek	.01	.01	.06	

Table 7. PERCENTAGE CONTRIBUTION OF DIFFERENT FOOD GROUPS TO CALORIES AND NUTRIENTS IN 293 HOUSEHOLDS IN CAGAYAN VALLEY-BATANES REGION: April-June, 1961

FOOD GROUPS	CALORIES	PROTEIN	FATS	CARBO-HYDRATES	CALCIUM	IRON	VITAMIN A	THIAMINE	RIBO-FLAVIN	NIACIN	ASCORBIC ACID
Per Caput Intake	1809	47.7 gm.	25 gm.	347 gm.	.40 gm.	12 mg.	2419 I.U.	.78 mg	.56 mg.	13.8 mg.	83 mg.
I. Cereals	69.89	55.32	13.85	79.69	8.91	28.60	.24	54.36	32.97	56.72	.11
II. Starchy Roots and Tubers	2.69	1.41	.20	3.33	2.23	3.99	3.13	4.74	3.06	1.74	17.79
III. Sugars and Syrups	4.24	.06	.69	5.58	2.47	3.03	-	-	-	.07	-
IV. Dried Beans, Nuts and Seeds	2.50	5.13	2.22	2.29	3.22	6.67	.40	9.49	5.41	2.46	.99
V. Leafy and Yellow Vegetables	.57	1.78	.32	.56	8.17	10.83	59.26	2.82	10.27	2.39	21.85
VI. Vitamin C-Rich Foods	.98	.57	.24	1.30	1.24	2.60	15.60	3.33	2.52	1.30	20.12
VII. Other Fruits and Vegetables	4.85	4.42	3.23	5.91	11.14	13.17	9.95	12.82	12.25	5.56	38.77
VIII. Meat, Poultry and Fish	7.81	26.30	37.28	.18	50.25	26.67	7.09	9.62	21.08	26.01	.21
IX. Eggs	.47	1.35	2.43	.03	.99	1.47	2.30	.64	4.51	.07	-
X. Milk and Milk Products	1.04	1.87	3.47	.54	9.65	.26	1.83	.77	7.21	.14	.07
XI. Fats and Oils	4.18	.27	33.24	.03	-	.17	.17	1.41	.18	-	.01
XII. Miscellaneous	.86	1.51	2.83	.56	1.73	2.34	.03	-	.54	3.54	.08
TOTAL PERCENT	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 8. NUMBER OF HOUSEHOLDS MEETING DIFFERENT LEVELS OF NUTRIENT ALLOWANCES
IN CAGAYAN VALLEY-BATANES REGION:
April-June, 1961

PERCENT OF RECOMMENDED ALLOWANCES	CALORIES	PROTEIN	CALCIUM	IRON	VITAMIN A	THIAMINE	RIBOFLAVIN	NIACIN	ASCORBIC ACID
100 and above	46	83	9	241	45	33	1	183	115
90 - 99	46	38	6	16	9	8	1	31	15
80 - 89	47	43	4	17	20	21	10	23	23
70 - 79	79	57	12	9	20	32	12	9	27
60 - 69	50	36	19	3	29	47	19	9	22
50 - 59	19	19	25	6	38	67	41	9	23
below 50	6	7	218	1	132	85	209	29	68
TOTAL HOUSEHOLDS	293	293	293	293	293	293	293	293	293

Table 9 . AVERAGE DAILY PER CAPITA FOOD INTAKE BY OCCUPATION
IN 293 HOUSEHOLDS IN CAGAYAN VALLEY-BATANES REGION:
April - June, 1961

NUMBER OF		OCCUPATIONAL GROUP	I CEREALS gm.	II STARCHY ROOTS & TUBERS gm.	III SUGARS & SYRUPS gm.	IV DRIED BEANS, NUTS & SEEDS gm.	V LEAFY & YELLOW VEG. gm.	VI VIT. C-RICH FOODS gm.	VII OTHER FRUITS & VEG. gm.	VIII MEAT, POULTRY & FISH gm.	IX EGGS gm.	X MILK & MILK PROD. gm.	XI FATS & OILS gm.	XII MISCELLANEOUS gm.
HOUSEHOLDS	MEMBERS													
6	55	I. Professionals and related workers	258	21	35	9	25	76	200	100	20	84	23	53
4	26	II. Proprietors, Managers, Administrators, officials	300	-	23	14	31	55	271	101	11	56	18	40
4	33	III. Clerical, office and related workers	327	11	22	11	27	65	212	108	14	40	10	16
7	53	IV. Salesmen and related workers	327	14	33	4	26	54	209	114	8	46	19	19
186	1120	V. Farmers, Fishermen, and related workers	372	13	27	16	25	27	128	53	2	8	5	16
-		VI. Workers in mines, quarry and related occupations	-	-	-	-	-	-	-	-	-	-	-	-
13	100	VII. Workers in operating transport occupations	325	12	31	8	23	46	277	135	8	36	16	26
13	122	VIII. Craftsmen, factory operators & related workers	342	10	19	13	39	37	172	61	4	29	7	15
6	37	IX. Manual workers and laborers	317	5	15	23	17	43	94	67	5	40	13	10
32	174	X. Service and related workers including Armed Forces	346	11	25	19	30	56	161	90	6	92	12	26
9	46	XI. None	370	1	22	16	17	24	203	82	7	21	12	30
6	48	XII. Retired	362	2	26	11	26	47	230	102	13	58	12	21
293	1814	RECOMMENDED ALLOWANCES:	326 ~~371~~	41 ~~237~~	32 ~~43~~	17 ~~35~~	63	83	95	110 ~~109~~	15 ~~13~~	187 ~~199~~	29 ~~37~~	none

DIETARY PHASE FIGURES

Figure 1. - AVERAGE DAILY PER CAPITA FOOD INTAKE COMPARED TO RECOMMENDED ALLOWANCES IN CAGAYAN VALLEY-BATANES REGION: April-June, 1961

Food Intake	Intake (gm)	Recommended Allowance (gm)
Total	761	1028
I. Cereals	349	326
II. Starchy Roots & Tubers	47	61
III. Sugars & Syrups	20	32
IV. Dried Beans, Nuts & Seeds	13	17
V. Leafy & Yellow Vegetables	24	68
VI. Vitamin C-Rich Foods	37	88
VII. Other Fruits & Vegetables	161	95
VIII. Meat, Poultry & Fish	75	110
IX. Eggs	5	15
X. Milk & Milk Products	22	187
XI. Fats & Oils (including fat from grated coconut)	8	29

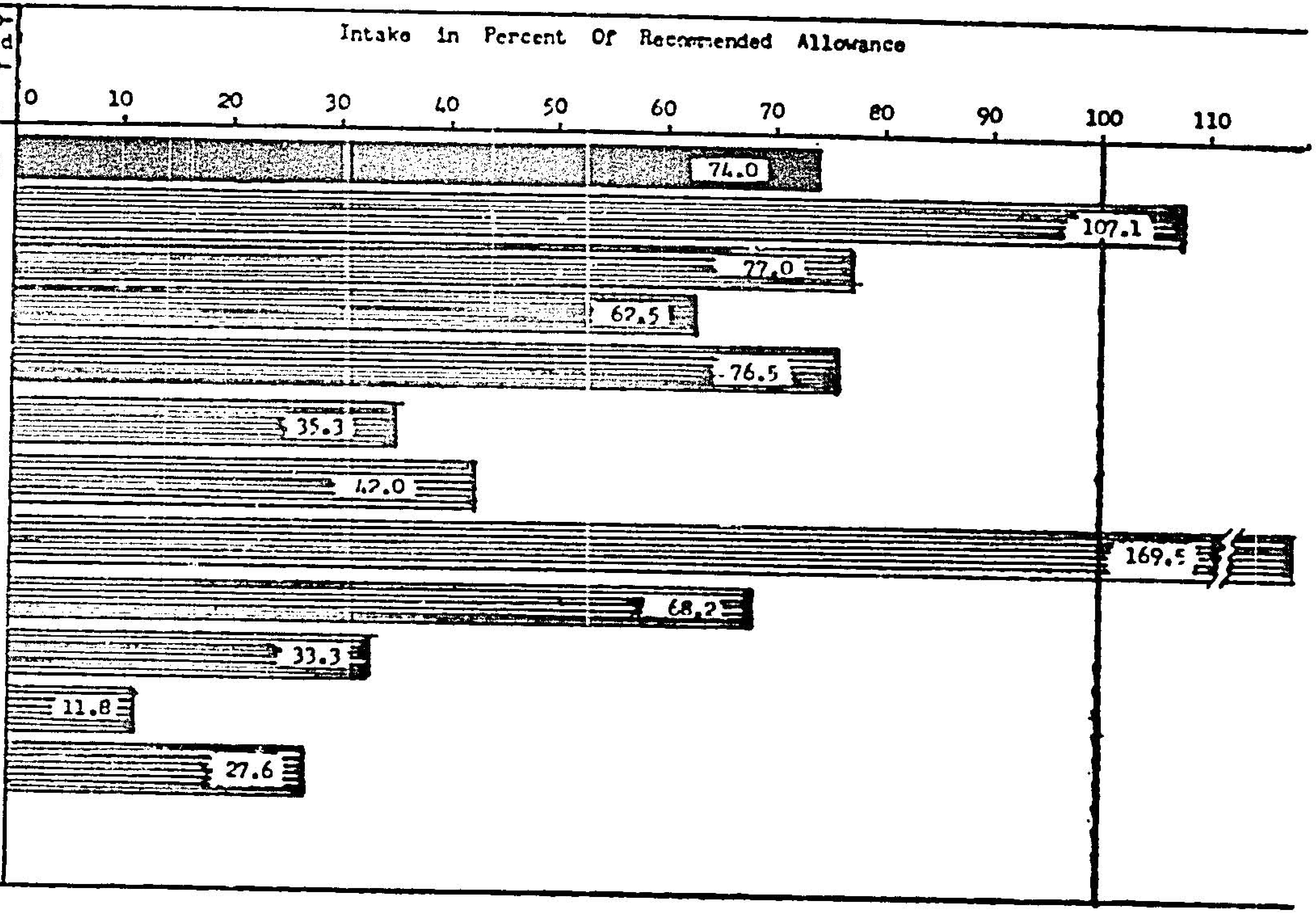


Figure 2. - AVERAGE DAILY PER CAPITA NUTRIENT INTAKES COMPARED TO RECOMMENDED ALLOWANCES IN CAGAYAN VALLEY-BATANES REGION:
April-June, 1961
6

Nutrients	Intake	Recommended Allowance
I. Calories	1809	2235
II. Protein (gm.)	47.7	55.1
III. Calcium (gm.)	.40	1.03
IV. Iron (mg.)	12.	8
V. Vitamin A (I.U.)	2419	3787
VI. Thiamine (mg.)	.78	1.20
VII. Riboflavin (mg.)	.56	1.38
VIII. Niacin (mg.)	13.8	12.0
IX. Ascorbic Acid (mg.)	83	71

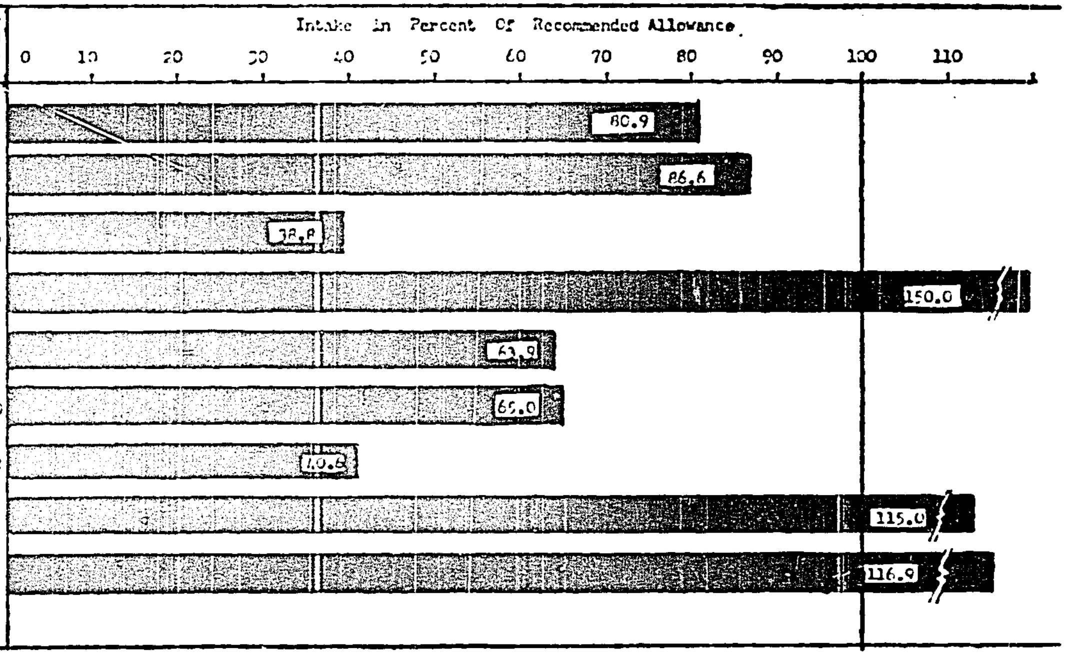


Figure 3. - PERCENTAGE DISTRIBUTION OF CALORIES, PROTEIN, FATS AND OF ANIMAL AND VEGETABLE SOURCES OF SOME NUTRIENTS IN 293 HOUSEHOLDS IN CAGAYAN VALLEY-BATANES REGION: April-June, 1961

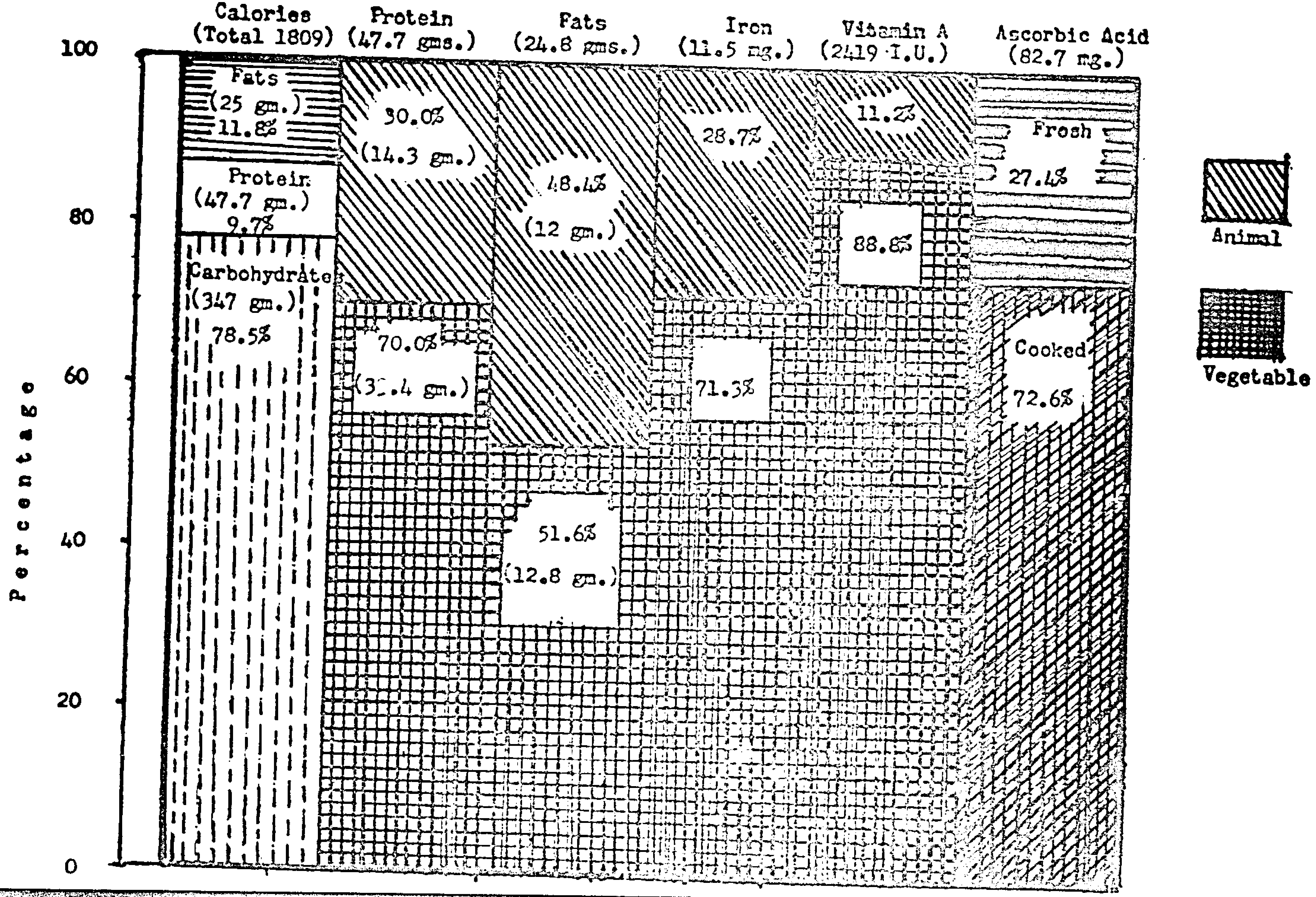
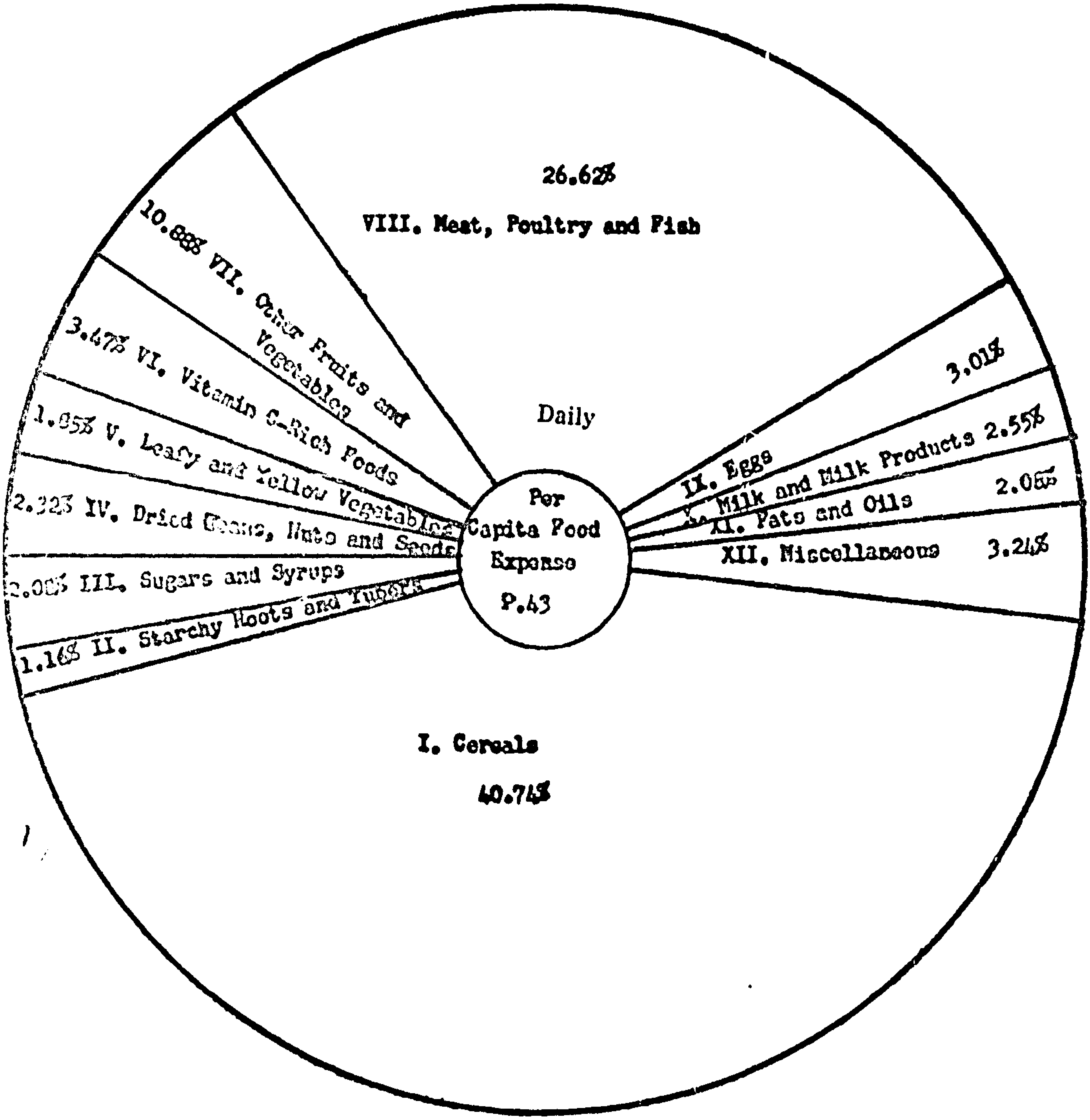
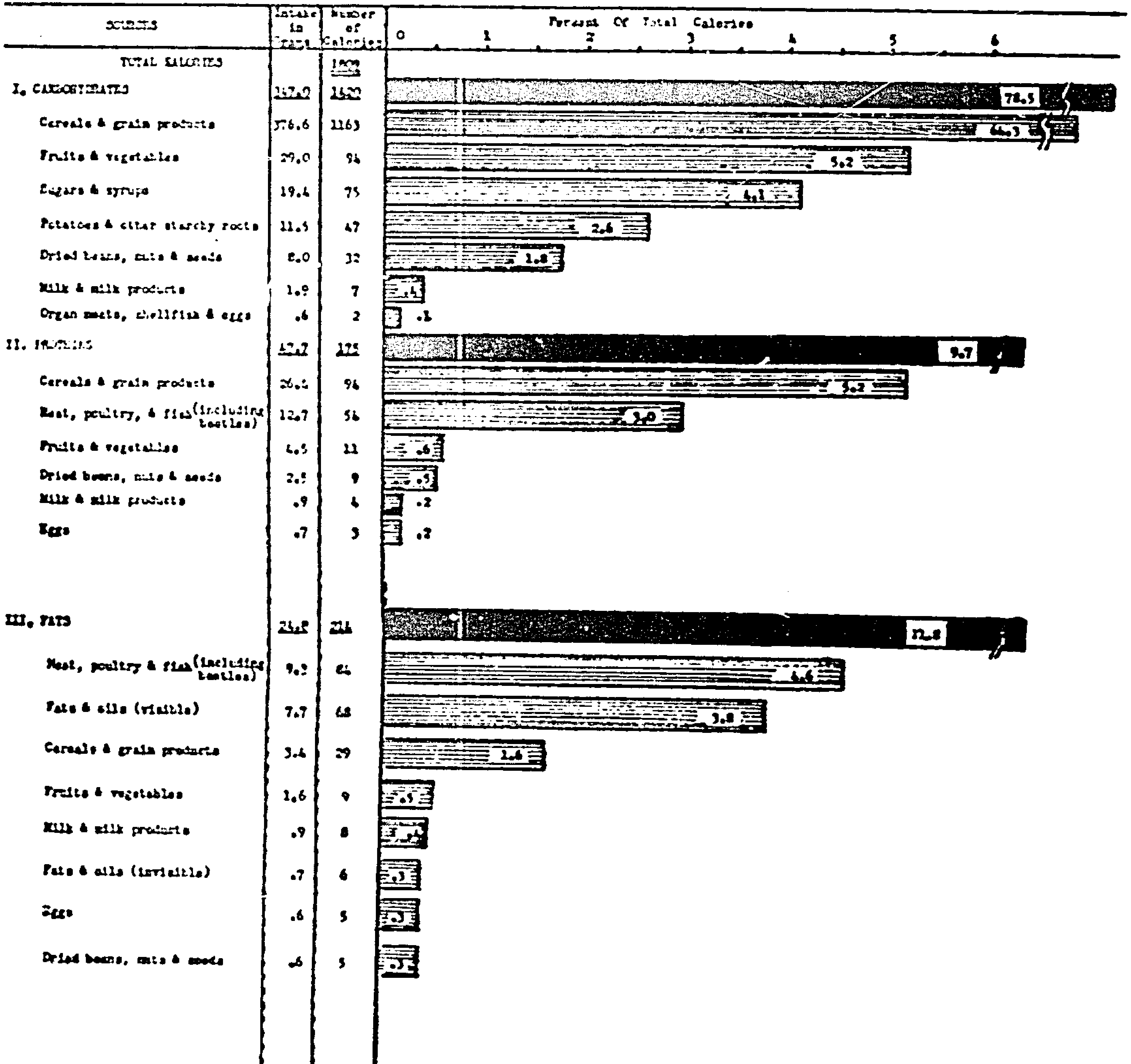


Figure 4. - PIE CHART SHOWING THE BREAKDOWN OF THE FOOD PESO BY FOOD GROUP* IN CAGAYAN VALLEY-BATANES REGION: April-June, 1961



*Refers to breakdown of the food peso into 100 centavos, thus 40.74 centavos are spent out of every peso for cereals, 26.62 for meat, poultry, fish, etc.

Figure 5. - SOURCES OF CALORIES IN CAGAYAN VALLEY-BATANES REGION,
April-June, 1961



SOURCES	Intake in Grams	Number of Calories	Percent Of Total Calories
TOTAL CALORIES		1809	
I. CARBOHYDRATES	447.0	1420	78.5
Cereals & grain products	376.6	1163	64.3
Fruits & vegetables	29.0	94	5.2
Sugars & syrups	19.4	75	4.1
Potatoes & other starchy roots	11.5	47	2.6
Dried beans, nuts & seeds	8.0	32	1.8
Milk & milk products	1.9	7	.4
Organ meats, shellfish & eggs	.6	2	.1
II. PROTEINS	47.7	175	9.7
Cereals & grain products	26.4	94	5.2
Meat, poultry, & fish (including beetles)	12.7	54	3.0
Fruits & vegetables	4.5	11	.6
Dried beans, nuts & seeds	2.5	9	.5
Milk & milk products	.9	4	.2
Eggs	.7	3	.2
III. FATS	24.8	214	11.8
Meat, poultry & fish (including beetles)	9.3	84	4.6
Fats & oils (visible)	7.7	68	3.8
Cereals & grain products	3.4	29	1.6
Fruits & vegetables	1.6	9	.5
Milk & milk products	.9	8	.4
Fats & oils (invisible)	.7	6	.3
Eggs	.6	5	.3
Dried beans, nuts & seeds	.6	5	.3

Figure 6. - SOURCES OF ANIMAL AND VEGETABLE PROTEINS IN CAGAYAN VALLEY-BATANES REGION: April-June, 1961

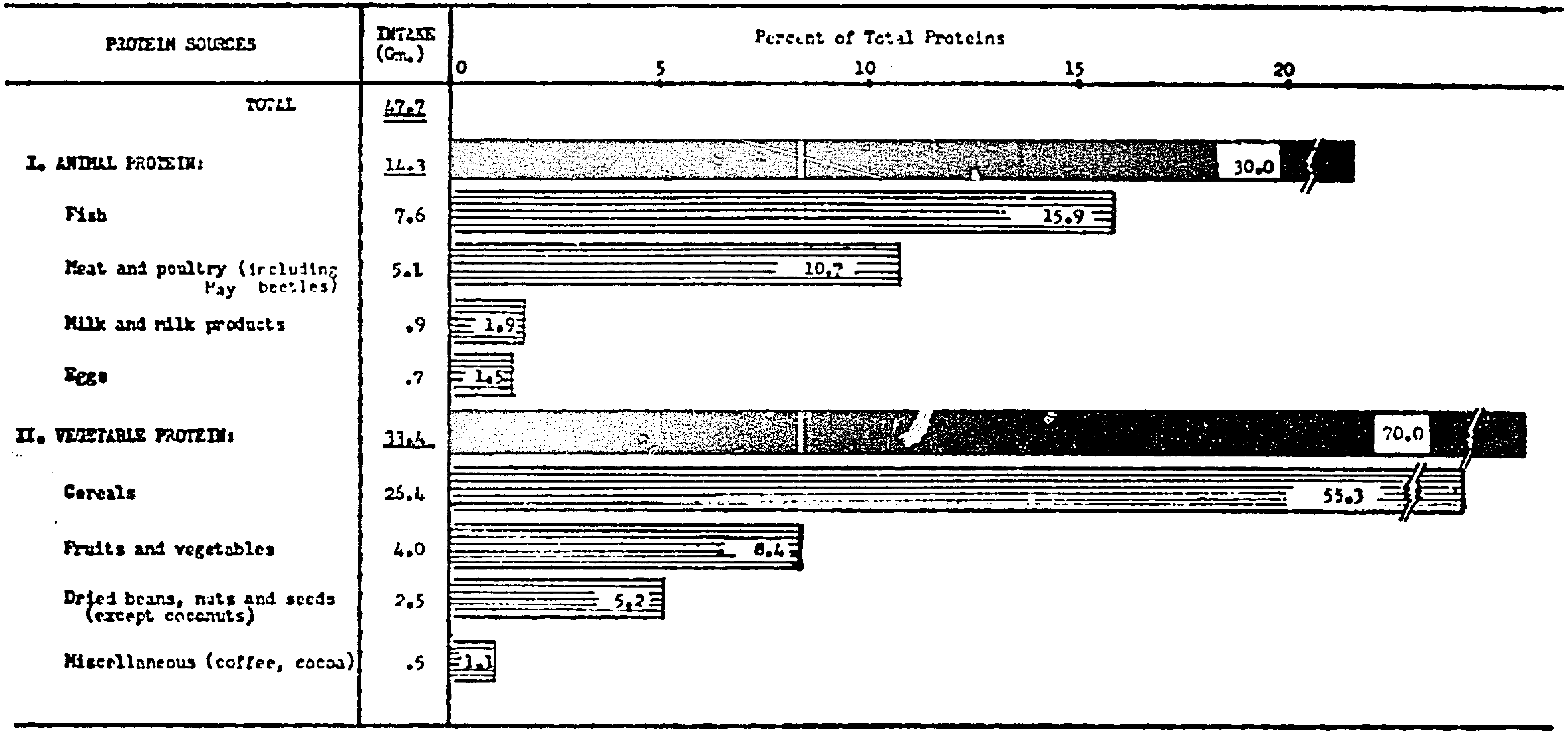


Figure 7. - SOURCES OF TOTAL ANIMAL AND VEGETABLE FATS IN CAGAYAN VALLEY-BATANES REGION: April-June, 1961

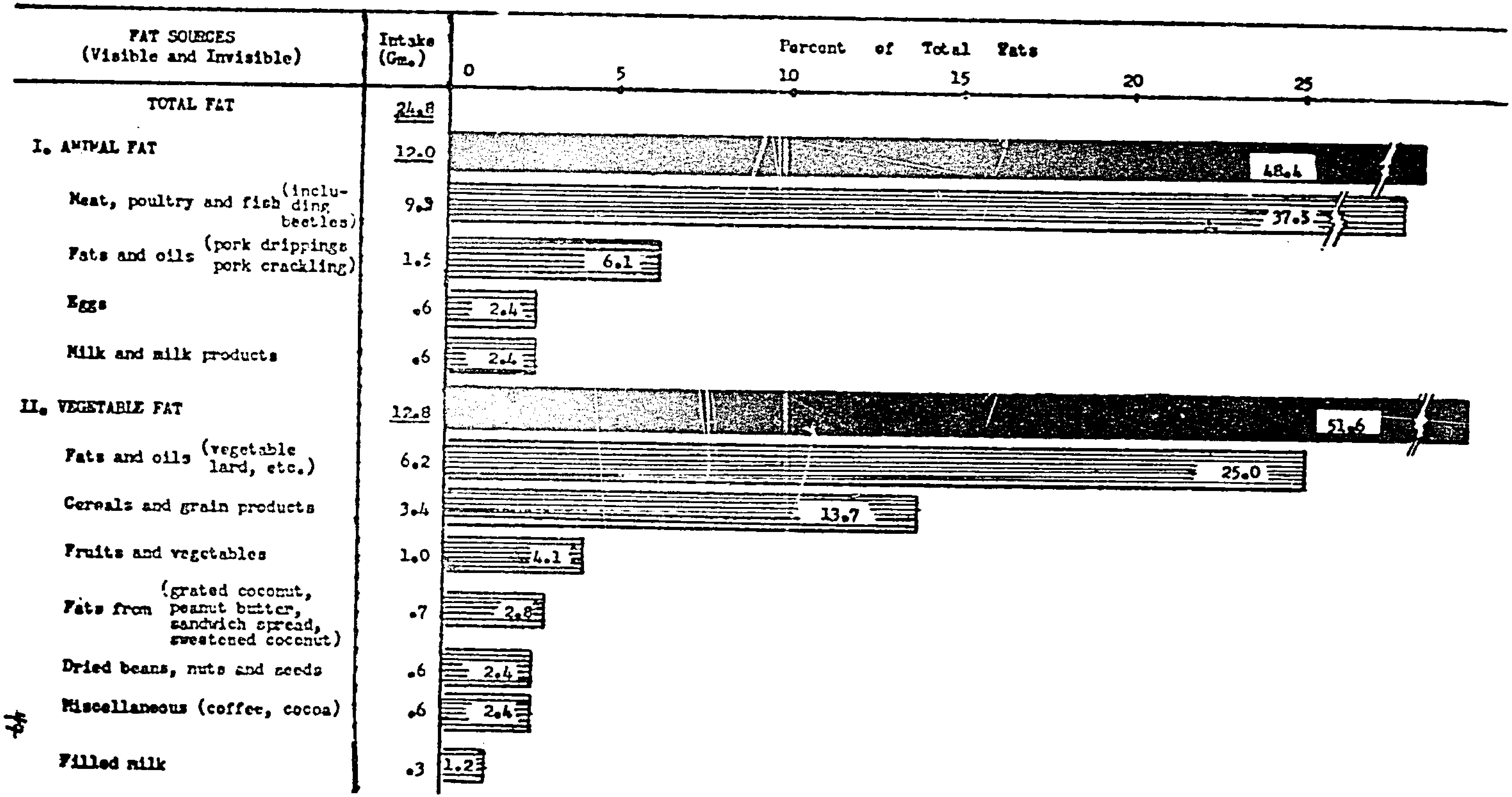
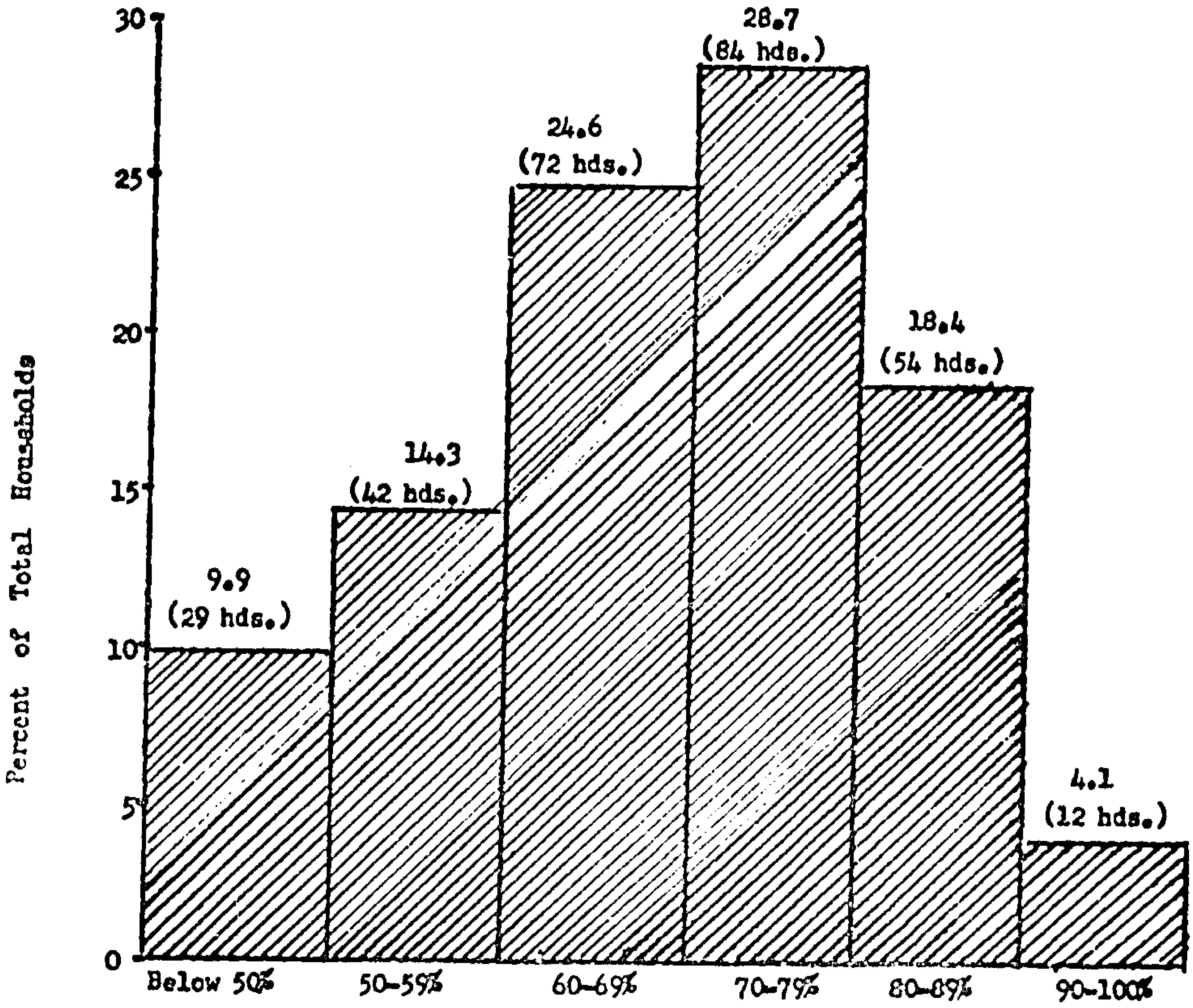


Figure 8.-PERCENTAGE DISTRIBUTION OF 293 HOUSEHOLDS BY DIET RATING* IN CAGAYAN VALLEY-BATANES REGION: April-June, 1961



*Represents the average percentage of adequacy for calories, protein, calcium, iron, vitamin A, thiamine, riboflavin, niacin and ascorbic acid.

Figure 9. - AVERAGE DIET RATING BY NUMBER OF HOUSEHOLD MEMBERS IN CAGAYAN VALLEY-BATANES REGION: April-June, 1961

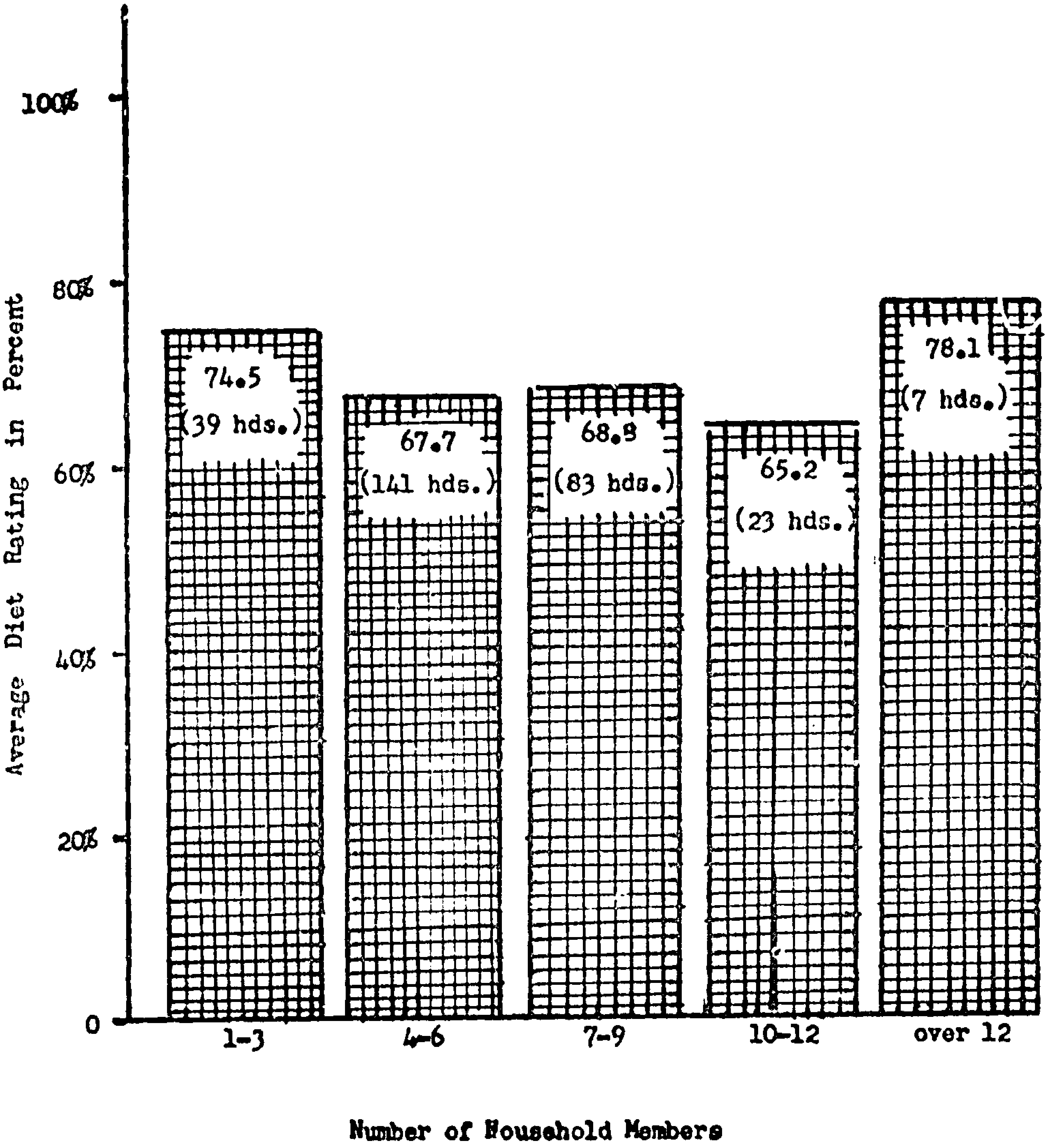


Figure 10. - AVERAGE DIET RATING BY YEARS OF SCHOOLING OF 293 HOUSEHOLDS IN CAGAYAN VALLEY-BATANES REGION: April-June, 1961

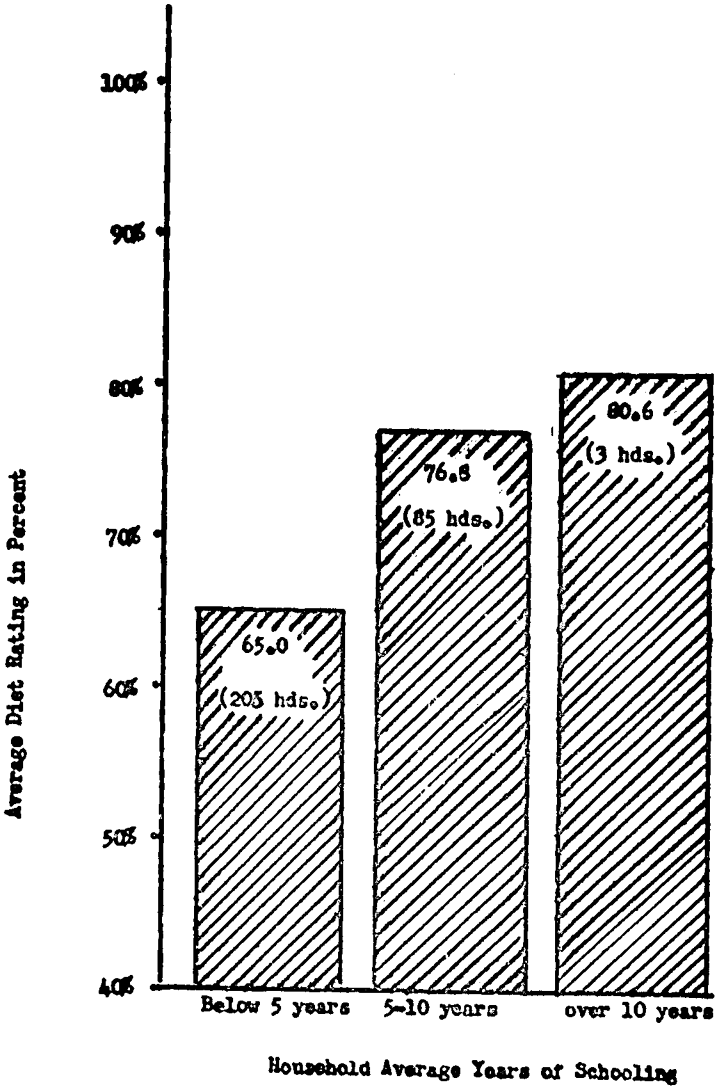
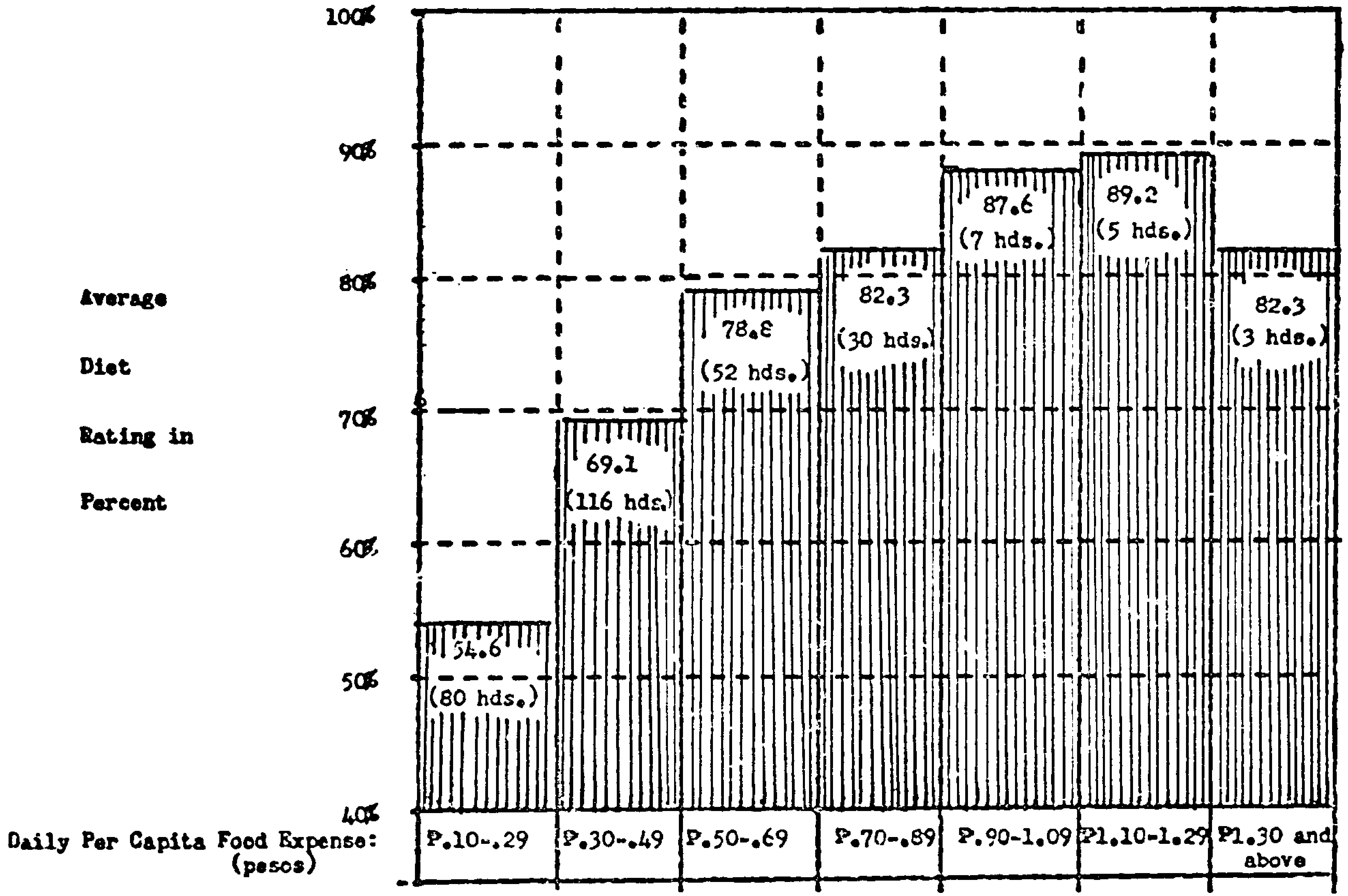


Figure 11. – AVERAGE DIET RATING BY DAILY PER CAPITA FOOD EXPENSE IN CAGAYAN VALLEY-BATANES REGION: April-June, 1961



Note. — One peso (P) is equivalent to 100 centavos; in American money, a Philippine peso is approximately 25 cents.

Figure 12. - AVERAGE DIET RATING BY PERCENTAGE OF HOUSEHOLDS ENGAGED IN FOOD PRODUCTION IN CAGAYAN VALLEY-BATANES REGION: April-June, 1961

PRODUCT	Number of Households	Percent of Households
TOTAL HOUSEHOLDS	293	100.00
Households engaged in food production	289	98.6
Staples	215	73.4
Vegetable garden	222	75.8
Fruit trees	263	89.8
Poultry	243	82.9
Pigs	235	80.2
Subsistence animals	196	66.9
Households not engaged in food production	4	1.4

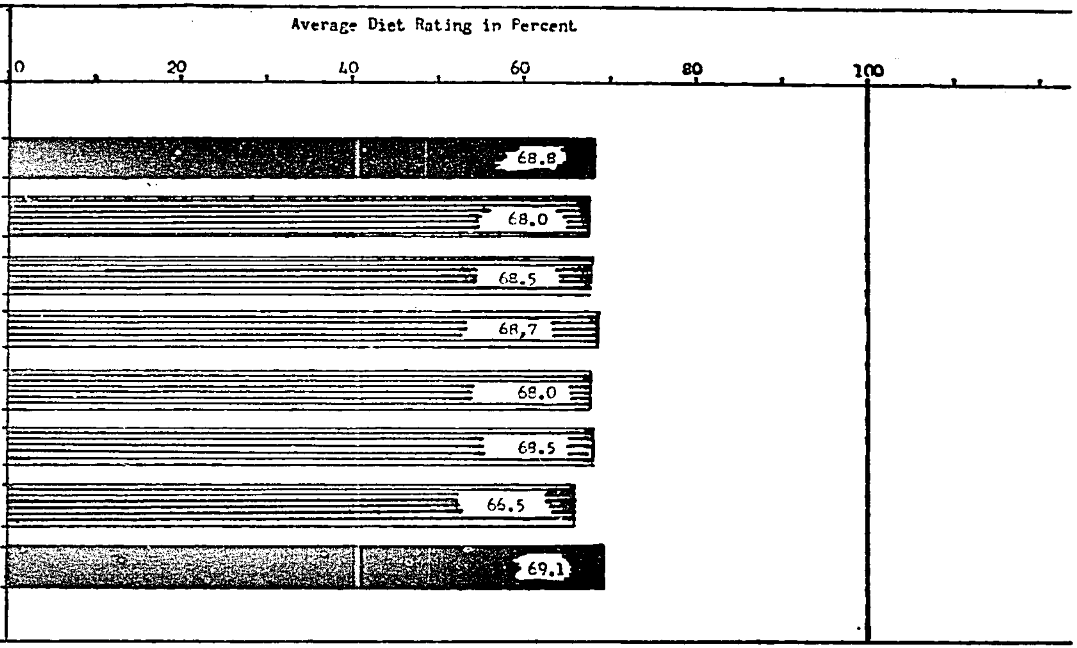


Figure 13. - AVERAGE DIET RATING BY OCCUPATION OF 293 HOUSEHOLD HEADS IN CAGAYAN VALLEY-BATANES REGION: April-June, 1961

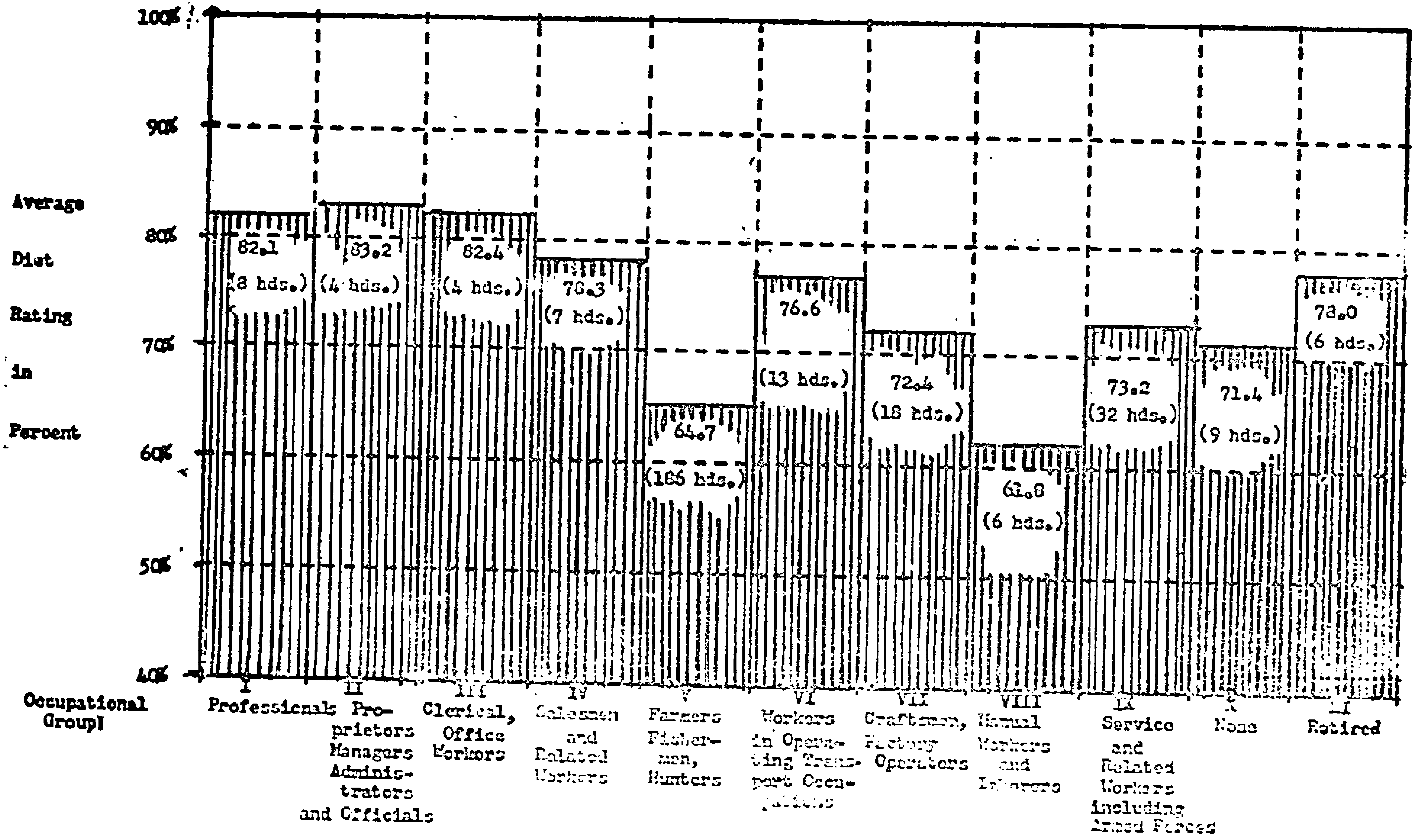


Figure 14. - AVERAGE DIET RATING BY PRINCIPAL DIALECT SPOKEN IN
293 HOUSEHOLDS SURVEYED IN CAGAYAN VALLEY-BATANES REGION:
April-June, 1961

Household Dialect	Number of Households	Percent of Total Households
TOTAL HOUSEHOLDS	293	100.00
Regional dialects:	218	74.4
Tagalog	11	3.8
Ilocano	202	68.9
Pangasinense	2	0.7
Pampango	1	0.3
Ibanag	2	0.7
Local dialects:	75	25.6
Ibatan	6	2.1
Gaddang	10	3.4
Itawes	59	20.1

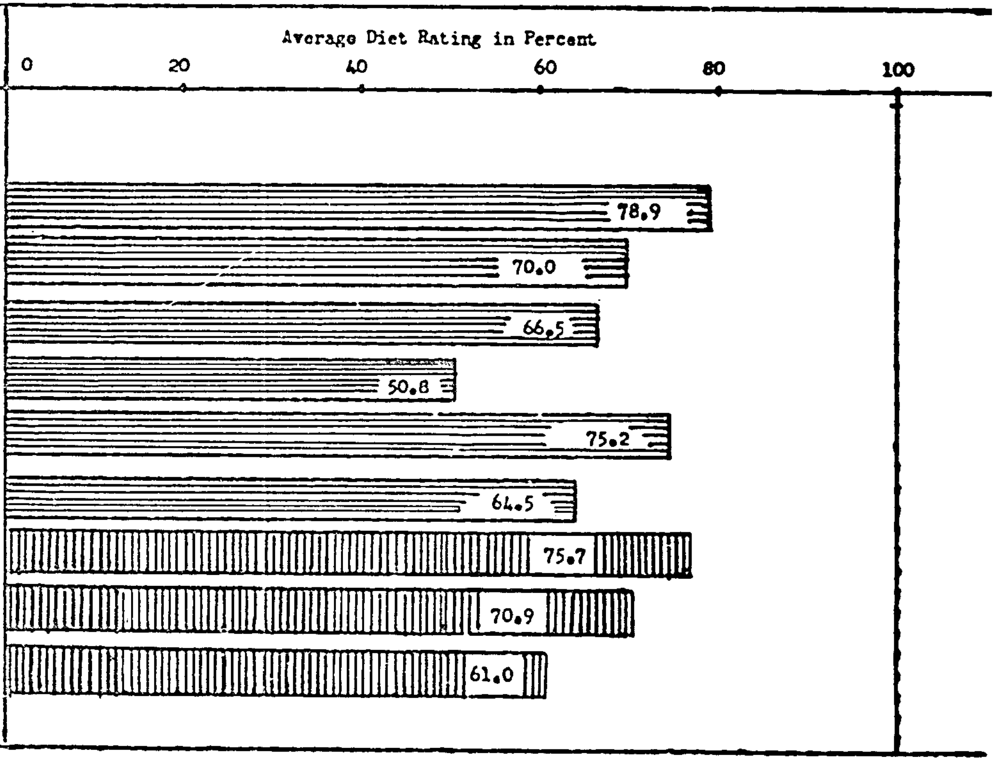


Figure 15. – AVERAGE DIET RATING BY MEMBERS WHO DID THE MARKETING IN 293 HOUSEHOLDS IN CAGAYAN VALLEY-BATANES REGION: April–June, 1961

Marketer	Number of Households	Percent of Total Households
TOTAL HOUSEHOLDS	293	100.0
Housewife	216	73.7
Maid or helper	9	3.1
Daughter	31	10.6
Husband or father	7	2.4
Others (mother, son, niece, daughter in-law, etc.)	22	7.5
Not marketing	8	2.7

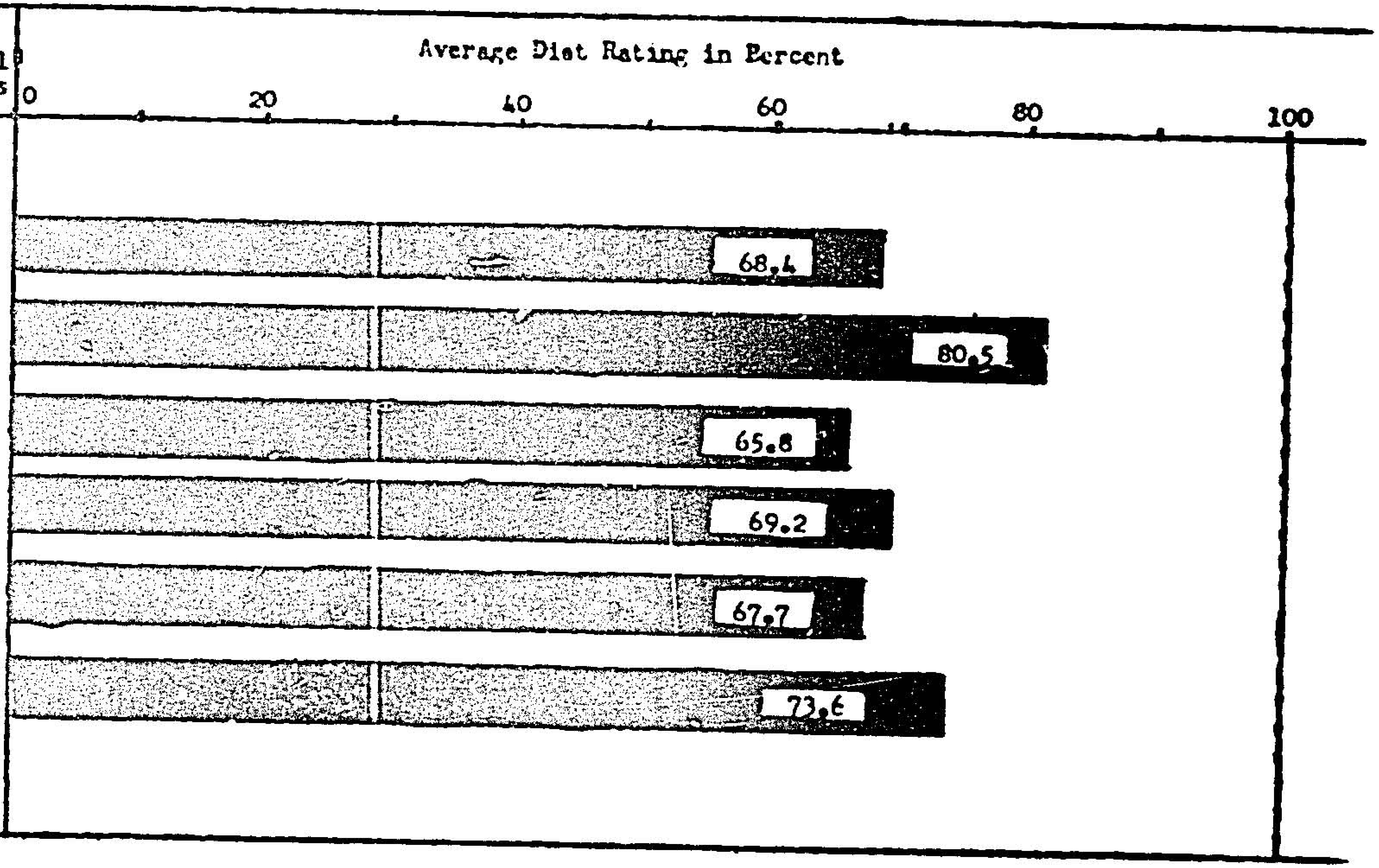


Figure 16. – AVERAGE DIET RATING BY MEMBERS WHO DID THE COOKING IN 293 HOUSEHOLDS IN CAGAYAN VALLEY-BATANES REGION: April–June, 1961

COOK	Number Of Households	Percent Of Total Households
TOTAL HOUSEHOLDS	293	100.0
Housewife	203	71.0
Maid or helper	12	4.1
Daughter	42	14.3
Husband or father	5	1.7
Others: (mother, son, niece, daughter in-law etc.)	26	8.9

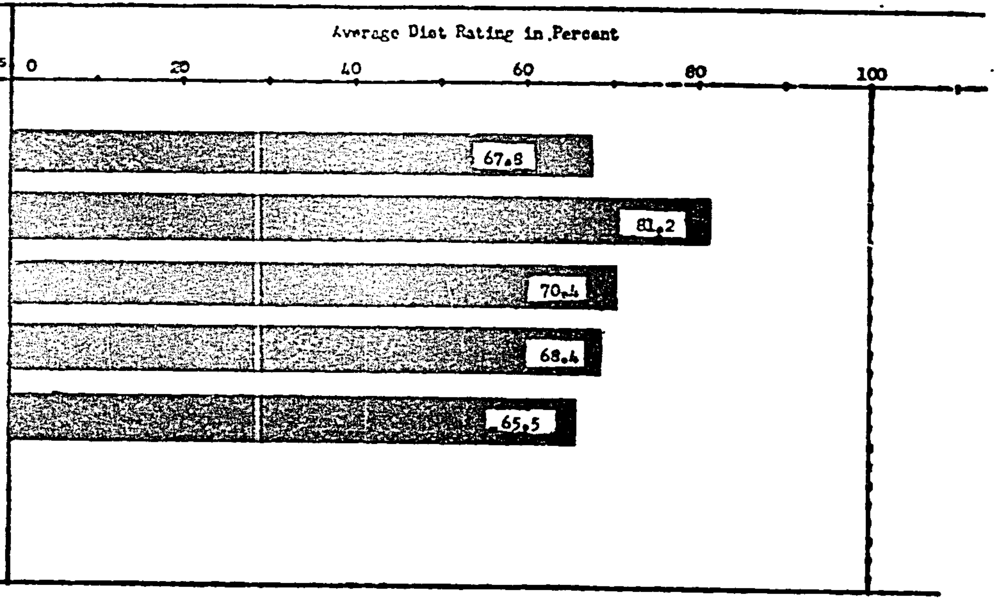


Figure 17. - AVERAGE DIET RATING BY TYPES OF FOOD STORAGE FACILITIES USED IN 293 HOUSEHOLDS IN CAGAYAN VALLEY-BATANES REGION: April-June, 1961

FOOD STORAGE FACILITIES	Number Of Households	Percent Of Total Households
TOTAL HOUSEHOLDS	293	100.0
Screened (cabinet)	24	8.2
Enclosed (cabinet, can, cupboard and box)	34	11.6
Semi-open (basket, bamboo closet, slat cabinet, pot, banguera)	145	49.5
Open (shelf, table, bamboo shelf, cabinet)	84	28.7
None	6	2.0

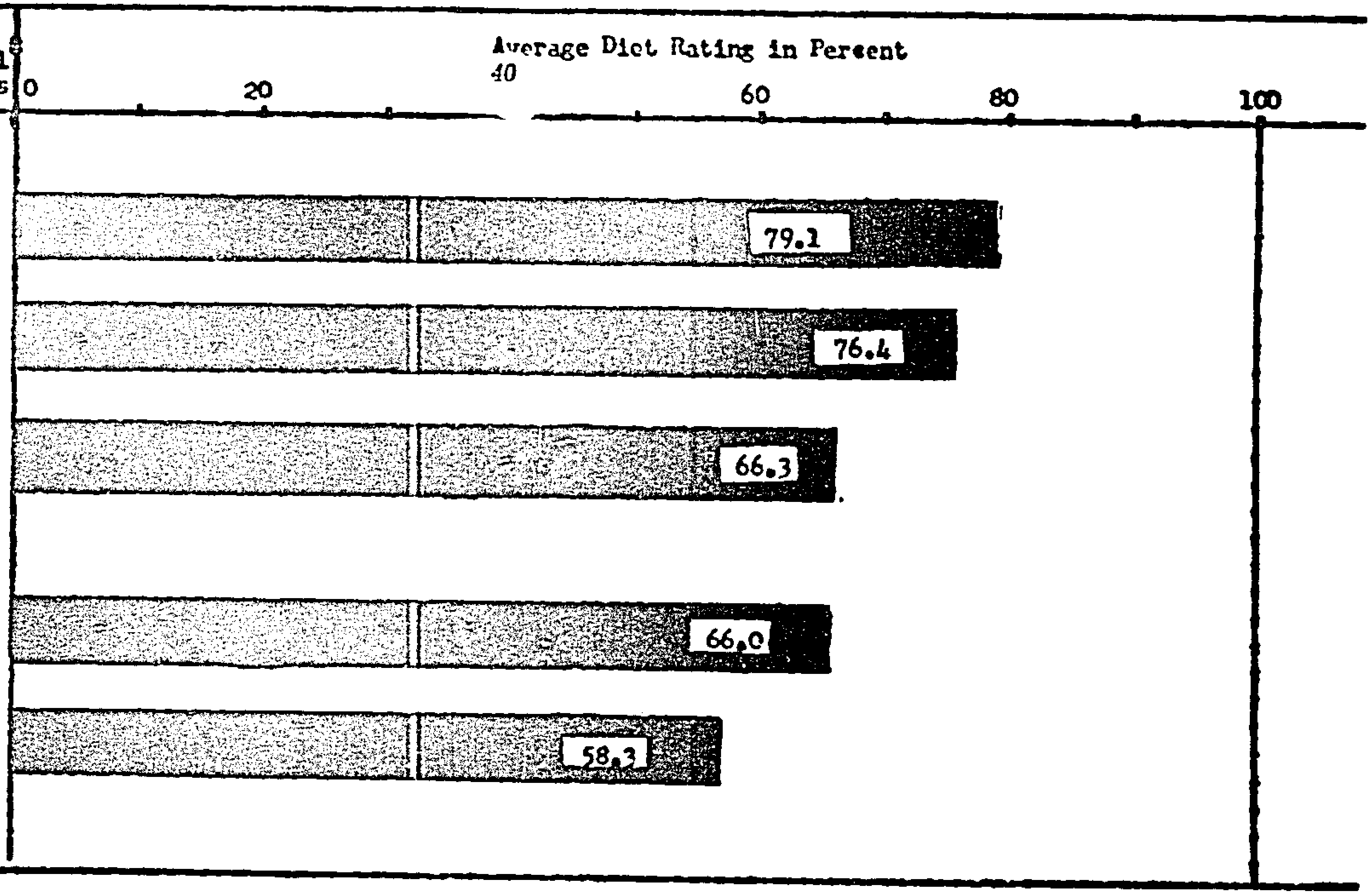


Figure 18. - AVERAGE DIET RATING BY TYPES OF COOKING FACILITIES USED
IN 293 HOUSEHOLDS IN CAGAYAN VALLEY-BATANES REGION:
April-June, 1961

COOKING FACILITIES	Number of Households	Percent of Total Households
TOTAL HOUSEHOLDS	293	100.0
Kerosene stove	4	1.4
Wood	288	98.3
Sawdust	1	0.3

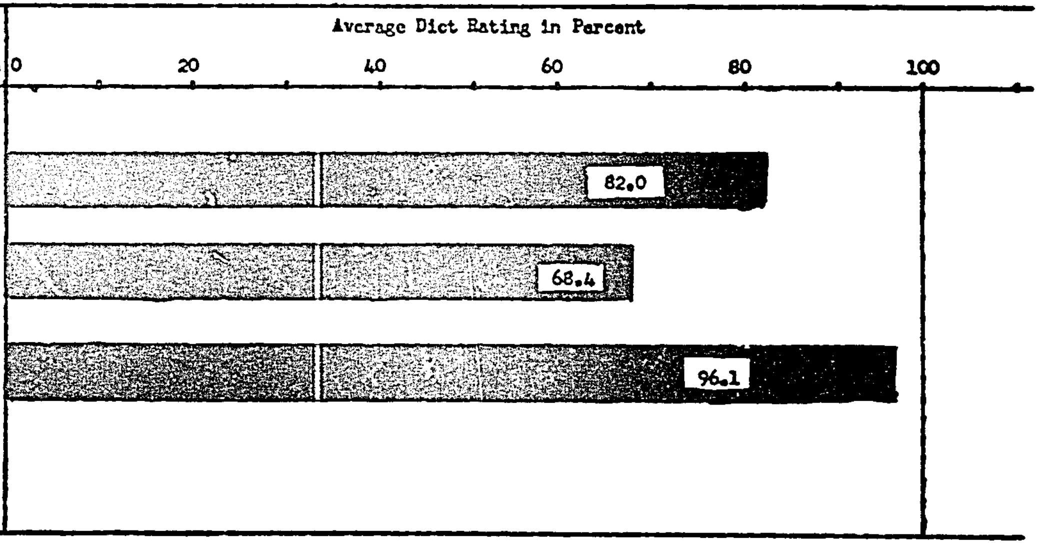
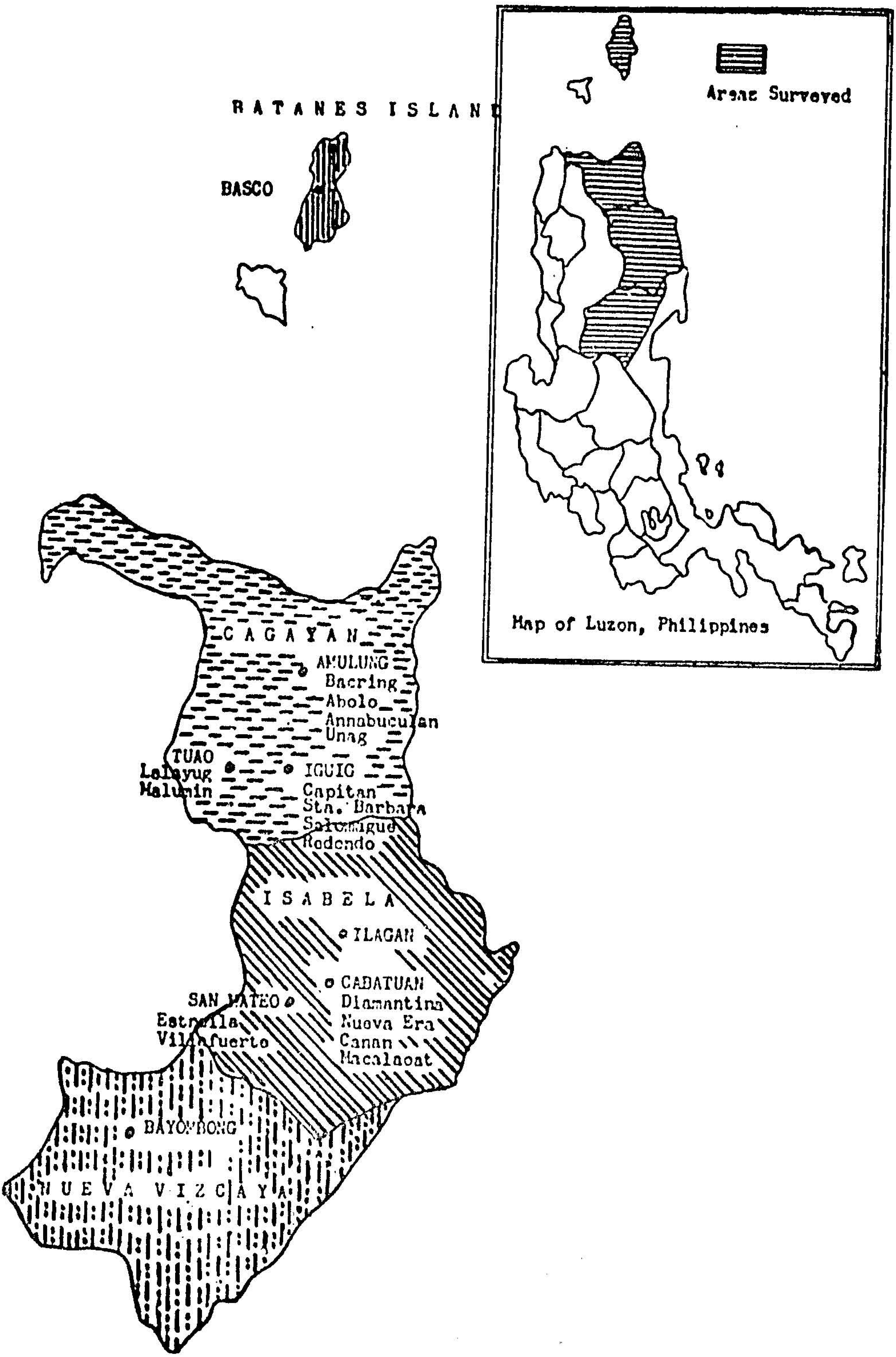


Figure A, MAP SHOWING AREAS INCLUDED IN THE SURVEY OF CAGAYAN VALLEY-BATANES REGION: April-June, 1961



BIOCHEMICAL SURVEY

II

BIOCHEMICAL PHASE

by

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INTRODUCTION

The biochemical phase through studies of nutrient levels in blood and urine provides supplementary data which when evaluated together with results of the dietary and clinical phases gives a more definite picture of the population's nutriture. These studies show not only the presence or absence of nutritional deficiency diseases but also the extent to which they may be present. Biochemical studies are most valuable when sub-optimal intakes of essential nutrients exist and mild nutritional deficiency symptoms cannot be clearly detected.

The biochemical phase covered a total of 733 individuals who are members of 153 households. Blood samples were collected from all members of biochemical sample households and urine samples from all adult members only. Due to the time consuming but precise biochemical tests employed in this phase, only approximately one half of the total number of households of both clinical and dietary phases were examined.

METHODS

Blood samples were collected by the finger prick method from all the members of biochemical sample households. Because micromethods were employed, the small volume of blood collected by this method was sufficient for all determinations done on whole blood and serum. Blood samples were drawn from a finger-tip which was previously cleaned with 85% alcohol by puncturing with a No. 11 Bard-Parker blade. The first drop was wiped off with a clean tissue paper and from the free-flowing blood a drop was pipetted for hemoglobin determination. The rest of the blood was collected in acid-cleaned capillary tubes, allowed to clot and then finally sealed with "Pyseal". Blood samples collected were placed in an amber-colored bottle and kept in an ice-cooled thermos jug.

Random urine samples were also collected from all adult members of the same sample households as it is not practical to collect either timed or fasting specimens in population surveys. About 50 ml of urine samples were placed in amber-colored bottles with plastic covers. Acidity of urine samples was adjusted to pH 4-5 with glacial acetic acid and the bottles were kept in another ice-cooled thermos jug.

After the day's collection the blood samples taken were centrifuged and from the serum, a 10 cu.mm. aliquot was treated with 40 cu.mm. of trichloracetic acid and separated for vitamin C analysis. Another 85 cu.mm. serum aliquot was set aside in 6 x 50 mm. tubes for vitamin A and carotene determinations. From the remainder of the serum a drop or two was used for total serum protein determination. The last portion of the serum was sealed in the capillary tube for serum albumin determination. Hemoglobin and serum protein analyses were done in the field by the gradient tube technique of Lowry and Hunter (6).

Serum aliquots were kept frozen in dry ice until analyzed in the Nutrition Research Laboratory of the Food and Nutrition Research Center. Serum vitamin C was determined using the colorimetric method of Lowry *et al* (7) and serum vitamin A and carotene by the method of Bessey *et al* (1) and taking into consideration the modifications of Utley and co-workers in the preparation of reagents (9). Serum albumin was also determined by a micro-method of Debro *et al* (2). For urinary thiamine excretion the Mickelsen *et al* method (8) was used while for riboflavin excretion the fluorophotometric procedure described in the ICNND Manual for Nutrition Surveys (4) was followed. The above-mentioned urinary excretions were expressed on a per gm creatinine basis; the latter was determined by the alkaline picrate method of Folin and Wu (3).

RESULTS AND DISCUSSION

Table 3 shows the percentage distribution of biochemical findings according to age groups. The percentage distribution of data in this table for "deficient", "low", "acceptable" and "good" follows levels in the suggested interpretative guide as shown in tables 1 and 2. The summary of biochemical data is presented in table 4 while a graphical representation of the regional percentage distribution for the different nutrients is presented in figure 1.

Hemoglobin

The mean hemoglobin values for both males and females in all the different age-groups were in the "low" level. The males in the 1-6 years age group and pregnant mothers showed lower mean values than the rest of the groups. In table 3 pre-school children had the lowest hemoglobin levels as shown by 86.4% of the males and 83.0% of the females in the "low" to "deficient" range. Out of the total number of individuals examined 69.0% were in the "low" to "deficient" levels. Based on the criterion used in the ICNND Manual for Nutrition Surveys (4) iron deficiency anemia is present in the region as shown by the 13.0% of the subjects in the "deficient" levels.

Total Serum Proteins-Serum Albumin and Globulin

Most of the total serum protein values were in the "acceptable" to "good" levels. Only 7.5% of all the subjects were found in the "low" to "deficient" levels. Percentage distribution of albumin showed that 80.7% of the subjects were in the "acceptable" to "good" levels. A great majority of the subjects in all age groups presented "acceptable" to "good" levels for serum albumin. Only males in the 7-12 years age group had 72.34% and pregnant mothers 55.6% of their subjects in the "acceptable" level. Similarly, for serum globulin 97.32% of all the subjects were in the "acceptable" to "good" levels. Levels of serum albumin and globulin confirm the "good" total serum protein levels.

Serum Vitamin C

The mean serum vitamin C value was .81 ± .42 mg per 100 ml which was in the "acceptable" level. Females showed better vitamin C level than males among the different age groups except in pre-school children where 44.4% of the females and 49.3% of the males were in the "acceptable" to "good" levels. For the whole region 20.3% and 25.2% of the 733 subjects were in the "low" and "deficient" levels respectively. Serum ascorbic acid levels are easily affected by recent intake and so close correlation between serum levels and dietary record is expected.

Serum Vitamin A and Carotene

The mean serum vitamin A value was 41 ± 20 mcg per 100 ml which is in the "acceptable" range. Considerable variations in serum vitamin A levels among the different age groups were observed. Age groups 13-20 years and 21 years and above including pregnant and nursing mothers showed good vitamin A nutriture. On the other hand, only 20.8% to 35.3% of subjects in the 1-6 years and 7-12 years age groups were in the "acceptable" to "good" levels. Because vitamin A is stored in the body and a long time is required for depletion, blood levels may not often be correlated with dietary studies. It has been suggested that a finding of 5 percent or more of the subjects with levels below 10 mcg per 100 ml or 15 percent below 20 mcg per 100 ml is evidence of vitamin A deficiency (5). With that as the criterion, vitamin A deficiency could be a problem in the region since 16.1% of the total number of subjects fell below the 20 mcg per 100 ml level.

Mean carotene value was 95 ± 49 mcg per 100 ml. which is in the "low" level. All the age groups showed that most of their subjects were in the "low" to "deficient" levels. Only 24.2% of all subjects examined were in the "acceptable" to "good" levels.

Urinary Thiamine

The mean urinary thiamine excretion of all subjects was 212 ± 120 mcg per gm creatinine which is within the "acceptable" range. Similar percentage distribution was observed between the male and the female adult age groups; surprisingly, pregnant and nursing mothers showed better thiamine nutriture than the rest of the groups. For the whole region 65.3% of adults were in the "acceptable" to "good" levels.

Urinary Riboflavin

The mean urinary riboflavin excretion level was 354 ± 160 mcg per gm creatinine which is in the "acceptable" range. Males in 13-20 years age group showed better riboflavin excretion levels than other adults. As much as 61.9 per cent of males in the 13-20 years age group were "acceptable" to "good" while only 40-50% of adults in the other age groups, including pregnant and nursing mothers, were in the same levels. Riboflavin excretion levels are easily affected by recent intake and therefore should be correlated with dietary intake.

SUMMARY

The biochemical phase of the nutrition survey of Cagayan-Batanes covered a total of 153 households composed of 733 individuals.

Results of biochemical tests showed "low" mean values for hemoglobin and "acceptable" mean values for total serum protein among the different age groups. Average mean values for albumin and globulin were in the "acceptable" to "good" levels. Mean serum vitamin C, vitamin A, mean urinary thiamine and riboflavin excretions were all in the "acceptable" levels while mean serum carotene was in the "low" level.

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BIOCHEMICAL PHASE TABLES AND FIGURE

TABLE 1 - GUIDE TO INTERPRETATION OF BLOOD DATA */

Nutritive substance in blood	Indicated level of nutrition @/			
	Deficient	Low	Acceptable	Good
Hemoglobin (gm./100 ml)				
Females (all ages)	Below 11.0	11.0-12.9	13.0-13.9	14.0 and above
Males (below 13)	Below 11.0	11.0-12.9	13.0-13.9	14.0 and above
Males (13 and 14)	Below 11.5	11.5-13.4	13.5-14.4	14.5 and above
Males (above 14)	Below 12.0	12.0-13.9	14.0-14.9	15.0 and above
+/Serum Protein (gm/100 ml)....	Below 6.0	6.0- 6.4	6.5- 7.5	Above 7.5
**/ Albumin (gm/100 ml)......	0-2.4	2.5- 3.4	3.5- 5.0	5.0
**/ Globulin (gm/100 ml)	1.0	1.0- 1.9	2.0- 2.9	3.0- 3.5
Ascorbic Acid (mg/100 ml)	Below 0.4	0.4- 0.6	0.7- 1.0	1.1 and above
Vitamin A (mcg/100 ml)...	Below 20	20-29	30-49	50 and above
Carotene (mcg/100 ml) ...	Below 75	75-124	125-199	200 and above

*/ Bessey, O.A. and O. H. Lowry, "Meals for Millions" Document No. 61, New York State Joint Legislative Committee on Nutrition, 1947.

@/ Interdepartmental Committee on Nutrition for National Defense, Manual for Nutrition Surveys. Washington D.C., U.S. Goforment Printing Office, May, 1957.

+/ Serum Protein Scale for "acceptable" and "good" levels have been modified, Ref.: Consolazio G. Frank, Robert E. Johnson and Evelyn Marck. Metabolic Methods. The C.V. Mosby Co. 1951.

**/ Serum albumin and globulin levels based on the personal interpretation of Dr. Allan Forbes. A report by the ICNND. The Kingdom of Thailand Nutrition Survey, p. 196, 1961.

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TABLE 2 - GUIDE TO INTERPRETATION OF URINARY VITAMIN EXCRETION DATA

Vitamin in urine	Indicated level of nutrition			
	Deficient	Low	Acceptable	Good
Thiamine 1/ .... mcg/gm. creatinine	Below 50	50-149	150 - 249	250 and above
Riboflavin 1/ .... mcg/gm. creatinine	Below 200	200-349	350 - 499	500 and above

1/ Based on published data on thiamine and riboflavin excretions and unpublished data of the Food and Nutrition Research Center, NIST, NSDB.

TABLE 3. PERCENTAGE DISTRIBUTION OF BIOCHEMICAL FINDINGS BY AGE GROUPS IN CAGAYAN VALLEY-BATANES REGION

NUTRIENTS	AGE GROUPS	1 - 6		7 - 12		13 - 20*		21 & above*		Nursing		Pregnant		Total		
		M	F	M	F	M	F	M	F	Below 21	21 & above	Below 21	21 & above	M	F	Regional
Hemoglobin	Number	59	53	67	62	50	63	125	94	0	30	0	10	301	312	613
Percent Distribution	Deficient	16.95	13.21	11.94	12.90	10.00	9.52	15.20	9.58		6.67		20.00	15.28	10.90	13.05
	Low	69.49	69.81	59.70	53.23	44.00	49.21	48.00	60.64		56.67		50.00	54.15	57.69	55.95
	Acceptable	11.86	9.43	17.91	27.42	24.00	28.57	16.00	23.40		23.33		30.00	16.95	23.09	20.07
	Good	1.70	7.55	10.45	6.45	14.00	12.70	20.80	6.38		13.33			13.62	8.33	10.93
Serum Protein	Number	70	63	75	73	60	76	146	123	0	35	0	11	351	381	732
Percent Distribution	Deficient	2.86	1.59		2.74		1.31						9.09	.57	1.31	.95
	Low	14.28	14.28	12.00	4.11	1.67	1.32	.9	8.13		0		18.18	6.55	6.56	6.56
	Acceptable	71.43	66.67	70.67	78.08	61.67	69.74	[illegible]	65.04		77.14		63.64	69.00	69.82	69.81
	Good	11.43	17.46	17.33	15.07	36.66	27.63	26.03	26.83		22.86		9.09	23.08	22.31	22.69
Albumin	Number	39	30	47	48	32	53	81	87	1	24	1	9	199	252	451
Percent Distribution	Deficient		3.33				1.89						11.11	0	1.19	.67
	Low	20.51	13.33	27.66	12.50	21.88	13.21	16.05	25.29		4.17	0	33.33	20.60	17.06	18.63
	Acceptable	74.36	73.34	72.34	85.42	75.00	81.13	81.48	72.41	100	91.66	100.00	55.56	76.89	78.18	77.60
	Good	5.13	10.00		2.08	3.12	3.77	2.47	2.30		4.17			2.51	3.57	3.10
Globulin	Number	39	30	47	47	32	53	81	86	1	23	1	9	199	249	448
Percent Distribution	Deficient	0				0	0							0		0
	Low	12.82	13.33	— 0	2.13	0	0	1.24	1.16	0		-		3.01	2.41	2.69
	Acceptable	23.08	33.33	14.89	31.91	18.75	35.85	19.75	18.61		21.74		33.33	19.10	27.31	23.66
	Good	64.10	53.34	85.11	65.96	81.25	64.15	79.01	80.23	100	78.26	100.00	66.67	77.89	70.28	73.66
Serum Vitamin C	Number	67	63	75	74	60	78	144	125	0	36	0	11	346	387	733
Percent Distribution	Deficient	26.86	20.63	20.00	17.57	23.33	12.82	26.39	12.00		30.55		18.18	24.56	16.54	20.33
	Low	23.88	34.92	25.33	17.57	20.00	17.95	32.64	24.00		27.78		18.18	27.17	23.51	25.24
	Acceptable	34.33	19.05	21.33	18.92	30.00	25.64	25.00	43.20		27.78		27.27	26.88	29.20	28.10
	Good	14.93	25.40	33.34	45.94	26.67	43.59	15.97	20.80		13.89		36.37	21.39	30.75	26.33
Serum Vitamin A	Number	53	53	71	68	55	70	130	114	0	34	0	11	309	350	659
Percent Distribution	Deficient	45.28	45.28	29.58	29.41	3.64	2.86	3.08	4.39		2.94		27.27	16.50	15.71	16.09
	Low	33.96	30.19	43.66	35.30	30.91	15.71	8.46	11.40		11.77		0	24.92	19.43	22.00
	Acceptable	13.21	20.76	26.76	25.00	45.45	50.00	56.15	53.51		55.88		72.73	40.13	43.14	41.73
	Good	7.55	3.77	0	10.29	20.00	31.43	32.31	30.70		29.41		0	18.45	21.72	20.18
Serum Carotene	Number	57	55	71	69	55	74	133	119	0	34	0	11	316	362	678
Percent Distribution	Deficient	70.18	70.91	47.89	42.03	41.82	12.16	31.58	11.77		35.29		36.37	43.99	29.56	36.28
	Low	17.54	10.91	40.84	40.58	45.45	33.78	49.63	52.10		41.18		27.27	41.14	38.12	39.53
	Acceptable	12.28	12.73	9.86	15.94	10.91	44.60	17.29	26.05		20.59		27.27	13.61	25.41	19.91
	Good	0	5.45	1.41	1.45	1.82	9.46	1.50	10.08		2.94		9.09	1.26	6.91	4.28
Urinary Thiamine	Number					21	25	134	98	0	33	1	8	155	165	320
Percent Distribution	Deficient							.74	2.04					.65	1.21	.94
	Low					38.10	44.00	36.57	30.61		24.24	100.00	12.50	36.77	30.91	33.75
	Acceptable					33.33	36.00	30.60	33.67		54.55		25.00	30.97	37.58	34.37
	[illegible]					28.57	20.00	32.09	33.68		21.21		62.50	31.61	30.30	30.94
Urinary Riboflavin	Number					21	25	135	98		33	1	8	156	165	321
Percent Distribution	Deficient					4.76	16.00	15.56	12.24		21.21		12.50	14.10	14.54	14.33
	Low					33.33	44.00	43.70	42.86		33.34	100.00	37.50	42.31	41.21	41.74
	Acceptable					23.81	28.00	25.18	25.51		27.27		37.50	25.00	26.67	25.86
	Good					38.10	12.00	15.56	19.39		18.18		12.50	18.59	17.58	18.07

*Pregnant Women and Nursing Mothers Excluded.

TABLE 4. SUMMARY OF BIOCHEMICAL DATA IN CAGAYAN VALLEY-BATANES REGION

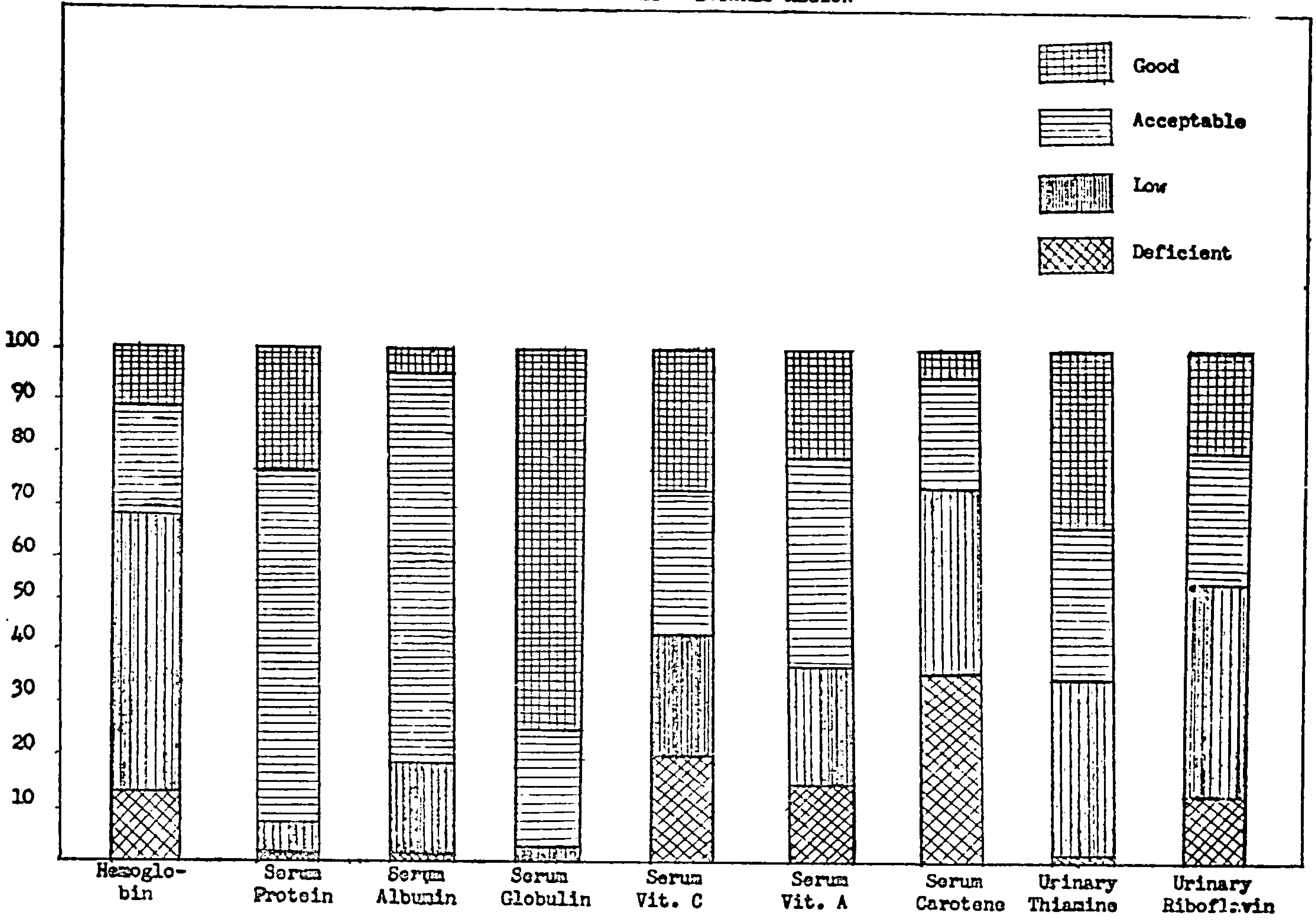
Nutrient	Sex and Age Group	Mean	Std. Dev.	Rating
Hemoglobin	Males-			
	1-6 years	11.86 gm/100 ml. blood	1.05	Low
	7-12 years	12.43 " " " "	1.20	Low
	13-20 years	13.42 " " " "	1.65	Low
	21 yrs. & above	13.57 " " " "	1.67	Low
	Females-			
	1-6 years	12.11 gm/100 ml. blood	1.26	Low
	7-12 years	12.52 " " " "	1.16	Low
	13-20 years */	12.73 " " " "	1.29	Low
	21 yrs. & above */	12.43 " " " "	1.14	Low
	Pregnant women	11.71 " " " "	1.65	Low
	Nursing mothers	12.50 " " " "	1.41	Low
Total Serum Protein	Males-			
	1-6 years	6.93 gm/100 ml. serum	.48	Acceptable
	7-12 years	7.09 " " " "	.51	Acceptable
	13-20 years	7.28 " " " "	.52	Acceptable
	21 yrs. & above	7.26 " " " "	.46	Acceptable
	Females-			
	1-6 years	7.10 gm/100 ml. serum	.61	Acceptable
	7-12 years	7.02 " " " "	.48	Acceptable
	13-20 years */	7.28 " " " "	.51	Acceptable
	21 yrs. & above */	7.22 " " " "	.50	Acceptable
	Pregnant women	6.82 " " " "	.65	Acceptable
	Nursing mothers	7.33 " " " "	.42	Acceptable
	ALL subjects	7.18 " " " "	.51	Acceptable
Serum Albumin	Males-			
	1-6 years	4.05 gm/100 ml. serum	.65	Acceptable
	7-12 years	3.86 " " " "	.65	Acceptable
	13-20 years	3.98 " " " "	.57	Acceptable
	21-yrs & above	3.98 " " " "	.58	Acceptable
	Females-			
	1-6 years	4.21 gm/100 ml. serum	.77	Acceptable
	7-12 years	4.05 " " " "	.51	Acceptable
	13-20 years */	4.10 " " " "	.52	Acceptable
	21 yrs. & above */	3.90 " " " "	.55	Acceptable
	Pregnant women	3.53 " " " "	.92	Acceptable
	Nursing mothers	4.16 " " " "	.47	Acceptable
	ALL subjects	3.99 " " " "	.58	Acceptable
Serum Globulin	Males-			
	1-6 years	3.15 gm/100 ml. serum	.76	Good
	7-12 years	3.53 " " " "	.52	Good
	13-20 years	3.44 " " " "	.65	Good
	21 yrs. & above	3.52 " " " "	.67	Good

Nutrient	Sex and Age Group	Mean	Std. Dev.	Rating
Serum Globulin	Females-			
	1-6 years	3.20 gm/100 ml. serum	.80	Good
	7-12 years	3.26 " " " "	.55	Good
	13-20 years*/	3.32 " " " "	.63	Good
	21 yrs. & above*/	3.53 " " " "	.62	Good
	Pregnant women	3.54 " " " "	.76	Good
	Nursing mothers	3.39 " " " "	.64	Good
	ALL subjects	3.41 " " " "	.68	Good
A/G Ratio	Males-			
	1-6 years	1.49	.64	Normal@/
	7-12 years	1.12	.26	Normal
	13-20 years	1.22	.42	Normal
	21 & above	1.20	.39	Normal
	Females-			
	1-6 years	1.48	.71	Normal
	7-12 years	1.32	.37	Normal
	13-20 years */	1.26	.35	Normal
	21 yrs. & above*/	1.17	.39	Normal
	Pregnant women	1.08	.51	Below normal
	Nursing mothers	1.31	.41	Normal
	ALL subjects	1.25	.45	Normal
Serum Vitamin C	ALL subjects	.81 mg/100 ml. serum	.42	Acceptable
Serum Vitamin A	ALL subjects	41 mcg/100 ml. serum	20	Acceptable
Serum Carotene	ALL subjects	95 mcg/100 ml. serum	49	Low
Urinary Thiamine	ALL adults	212 mcg/gm. creatinine	120	Acceptable
Urinary Riboflavin	ALL adults	354 mcg/gm. creatinine	160	Acceptable

@ Values below 1,10 are considered below normal for A/G ratio.

* Pregnant women and nursing mothers excluded.

FIGURE I - PERCENTAGE DISTRIBUTION OF TOTAL SUBJECTS BY NUTRIENTS IN CAGAYAN VALLEY - BATANES REGION



III

CLINICAL PHASE

The clinical phase of the survey was done simultaneously with the biochemical and dietary phases. All subjects listed in the dietary phase were included in the clinical survey, except the invalids and the sick. A total of 292 households with 1719 members were examined. Subjects were assembled whenever possible in a place conveniently located for physical examination, otherwise they were examined in their respective homes. The clinical phase also included the stool examination of all subjects for intestinal parasitism.

PROCEDURE

A brief physical examination with emphasis on the detection of nutritional deficiencies was performed, but a more detailed examination was done on those subjects with signs suggestive of thiamine deficiency. Detailed examination for adult meant looking for other causes of edema, absence of knee jerk, impairment of position sense of toes, absence of vibratory sensation, dysesthesias, tingling and numbness, tightness of the waist, easy fatigability and palpitation. In infants, additional signs looked for included aphonia, ptosis, head drop, opisthotonus and purposeless movements (1). For all subjects, height, weight, skinfold thickness measurements and blood pressure readings were also taken, but their analysis is not included in this report. It will be reported on another paper.

In the examination of stools, the direct smear method was adopted, it being the most convenient and practical for field work. For positive smears, three samples from the same specimen were taken for examination. For negative smears, five samples from the same specimen were examined for verification.

RESULTS AND DISCUSSION

The results presented here should not be taken as conclusive evidence of malnutrition, but rather they should be correlated with the results of the dietary and biochemical surveys to form a more accurate picture of the nutritional status of the region. The non-specificity of the clinical signs of malnutrition make it difficult to evaluate accurately the results from the clinical survey alone. (2)

There were 1719 subjects examined, 834 of them were males and 885 females. Their ages ranged from a few days to over sixty years.

The preschool group constituted the biggest percentage, with the school-age group forming the second biggest group. The least number came from both the very young and the very old groups. There were 28 pregnant women and 87 nursing mothers among the subjects and they represented 1.6% and 5.06%, respectively, of the whole sample.

Of the 1719 subjects examined, 69.17% were classified as fair, 26.53% as good and only 4.30% as poor in their general appearance. The prevalence of the different signs associated with nutritional deficiency according to sex and age group is shown in Table I, while a summary of the clinical findings is shown in Table II. Signs suggestive of Vitamin A deficiency were the most prevalent. In both sexes (Table I), Bitot's spot was more prevalent in the 1-6 and 7-12 years age groups. Dry conjunctiva was prevalent from age one up to 60 and above age group, especially in pregnant and nursing mothers where the prevalence was very much higher. There were 731 or 42.52% subjects who had xerosis of the legs and 523 or 30.42% had dry conjunctiva (Table II). There was a very high prevalence of xerosis of the legs in the 7-12 years old group, 62.6% for males and 52.3% for females. Could it be that during or even before this stage of life, the Vitamin A stores of the body had been so depleted to cause the appearance of these lesions? However, lesions of the eye and skin should not be taken as pathognomonic of this deficiency because exposure to wind, sun, rain and dust can produce lesions similar to Vitamin A deficiency. This is especially true of farmers and fisherman because of the nature of their work.

Signs suggestive of past or present riboflavin deficiency were the next most frequently seen (Table II); 31.59% had angular scarring. Nasolabial seborrhea was present in 2.50% and active angular stomatitis in 1.22% of the total subjects. From age group 0-11 months up to the 21 to 39 years age groups, active angular stomatitis was prevalent, but above these age groups this sign was not found in any of the subjects examined. As expected, the prevalence of angular scars increased from age one up to 60 and above age group.

Bleeding gums was the most common manifestation suggestive of Vitamin C deficiency, with 20.59% of all subjects showing this sign and with the prevalence increasing from infancy to the older age groups. In the older age groups, bleeding gums and gingivitis may be attributed to poor oral hygiene. In the lower age groups however, gingivitis and bleeding gums are highly suggestive of ascorbic acid deficiency.

Changes in the papillae in the form of atrophy of the filiform and hypertrophy of the fungiform papillae were present in 37.81% of the subjects. These changes were more frequently seen in "buyo" chewers, and these changes may be attributed to the irritating effects of the lime and the betel nut rather than to niacin deficiency.

Enlarged thyroid gland was present in 4.89% of all the subjects, with 1.07% in the males and 8.51% in the females. In one particular family, all members had enlargement of the thyroid. In the group of pregnant women, 45.9% had enlarged thyroid.

There were only two subjects with bilateral edema of the legs. Both were females, one a young girl and the other a pregnant woman. Both were negative for other signs suggestive of thiamine deficiency.

Signs suggestive of Vitamin D deficiency were present in 2.67% of the subjects examined. Bossing of the skull bones was present in 1.16%, chest deformities in 0.93%. Ten subjects, or 0.58% of the total sample, 9 of them children and one adult, had winged scapula.

No age group was exempted from intestinal parasitism (Table III). The youngest subject found positive for parasitism was one of 5 months of age. As much as 86.2% of the subjects were found positive for parasitism of one kind or another. The great majority of these had ascaris, either alone (63.8%) or combined with other parasites (12.3%). Hookworm affected 17.94%, of which 8.5% had it alone.

It will be interesting to compare the clinical findings in the Ilocos-Mt. Province Region (3) with the Batanes-Cagayan Valley Region, since both have practically the same climate (4,5) and are inhabited by people of similar ethnic and cultural background. In general, based only on clinical findings, it may be inferred that the inhabitants of the Ilocos-Mt. Province Region are better nourished than the people of the Batanes-Cagayan Valley Region (Table IV). The distribution of the deficiencies for the different age groups in both regions is similar with variations occurring only in the number of those who were positive for signs of deficiencies. The exception to this is in the incidence of Bitot's spot, one of the signs of Vitamin A deficiency, which was found only in adults in the Ilocos-Mt. Province Region (3) but was frequently found in children and young adults in the Batanes-Cagayan Valley Region (Table II).

SUMMARY

Two hundred and ninety-four households with 1719 subjects were physically examined during the clinical phase of the nutrition survey of the Batanes-Cagayan Valley Region.

Signs suggestive of Vitamin A deficiency were found most frequently, followed by niacin, riboflavin, ascorbic acid and iodine deficiencies. Xerosis of the legs was the most common sign found suggestive of Vitamin A deficiency; for niacin, that of significant papillary changes; for riboflavin, that of angular scars and for Vitamin C, bleeding gums. There were only two cases of bilateral edema seen, one in a child and the other in a pregnant woman but these were not accompanied by other signs of thiamine deficiency.

The most common parasites found were ascaris and hookworm.

Of the total number of subjects examined, 69.17% were classified as fair, 26.53% as good and 4.30% as poor.

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TABLE 1 - PERCENTAGE OF SUBJECTS BY AGE AND SEX SHOWING CLINICAL FINDINGS IN CAGAYAN VALLEY-BATANES REGION

AGE	0-11 mos.		1-6 yrs.		7-12 yrs.		13-20 yrs.		21-39 yrs.		40-59 yrs.		60 yrs. & above		PREGNANT		NURSING	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	20 & below	21 & above	20 & below	21 & above
No. of SUBJECTS	37	30	192	196	166	165	140	135	176	85	95	109	32	26	5	27	5	98
General Appearance:																		
Good	48.6	50.0	26.0	23.1	11.4	21.2	24.3	51.1	27.3	23.5	20.0	20.2	18.8	23.1	60.0	18.5	40.0	30.6
Fair	48.6	50.0	70.3	69.4	81.9	71.5	72.1	48.2	71.0	71.8	76.8	67.9	71.9	73.1	40.0	81.5	60.0	64.3
Poor	2.7	0	3.6	2.6	6.6	7.3	3.6	0.7	1.7	4.7	3.2	11.9	9.4	3.8	0	0	0	5.1
Eyes:																		
Bitot's Spot	0	0	0.5	0.5	0.6	0.6	2.9	0	0.6	0	0	0	0	0	0	0	0	1.0
Dry Conjunctiva	0	0	13.5	7.1	41.0	30.9	45.7	38.5	34.1	42.4	41.0	36.7	25.0	30.8	40.0	48.2	60.0	39.8
Conjunctival Injection	0	0	0	0.5	1.2	0	2.1	3.0	4.5	1.2	4.2	1.8	0	0	0	0	0	0
Circumcorneal Injection	0	0	0	0	0	0	0	0	0	0	0	1.8	0	0	0	0	0	0
Skin - Face:																		
Nasolabial Seborrhea	0	0	0	0	0	0	0.7	1.5	6.2	4.7	7.4	1.8	21.9	11.5	0	7.4	0	4.1
Lips:																		
Active Angular Stomatitis	2.7	0	3.6	2.0	1.8	0.6	0.7	0.7	1.1	0	0	0	0	0	0	0	0	1.0
Angular Scars	0	0	12.5	11.7	41.0	29.7	39.3	31.1	43.8	38.8	49.5	39.4	62.5	46.2	60.0	37.0	0	37.8
Tongue:																		
Significant Papillary Changes	0	0	2.1	2.0	14.5	15.8	42.1	40.7	60.8	64.7	89.5	83.5	93.8	92.3	60.0	59.3	20.0	67.4
Gums:																		
Marginal Gingivitis	0	0	0	0	0	0	0	0.7	2.3	4.7	11.6	1.8	3.1	0	0	0	0	1.8
Bleeding Gums	0	0	9.4	11.2	17.5	15.8	24.3	11.8	35.8	22.4	37.9	27.5	50.0	42.3	20.0	22.2	20.0	26.5

TABLE 1.- PERCENTAGE OF SUBJECTS BY AGE AND SEX SHOWING CLINICAL FINDINGS IN CAGAYAN VALLEY-BATANES REGION (cont'd)

AGE	0-11 mos.		1-6 yrs.		7-12 yrs.		13-20 yrs.		21-39 yrs.		40-59 yrs.		60 yrs. & above		PREGNANT		NURSING	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	20 & below	21 & above	20 & below	21 & above
No. of SUBJECTS	37	30	192	196	166	165	140	135	176	85	95	109	32	26	5	27	5	98
Teeth:																		
Dentures	0	0	0	0	0	0	0	0.7	1.1	1.2	1.0	3.7	9.4	3.8	0	0	0	2.0
Flourosis	0	0	0.5	0	0	0	0	0	0	0	0	0	0	0	0	3.7	0	0
Glands:																		
Thyroid, Enlarged	0	0	0	0	1.8	6.7	2.9	11.1	0	14.1	2.1	9.2	0	11.5	20.0	25.9	0	16.3
Skeletal:																		
Bossing	0	6.7	5.2	5.1	1.2	0	0	0	0	0	0	0	0	0	0	0	0	0
Chest Deformities	0	0	4.7	1.0	3.0	0	0	0	0	0	0	0	0	0	0	0	0	0
Winged Scapula	0	0	0	1.0	2.4	1.8	0	0	0	0	0	0.9	0	0	0	0	0	0
Skin - General:																		
Hyperkeratosis, Follicular, Arms	0	0	0	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyperkeratosis, Follicular, Others	0	0	1.0	1.0	0	1.2	0	0	0	0	0	0	0	0	0	0	0	0
Pellagrous Dermatitis	0	0	0	0	0.6	0.6	0	0	0	0	0	0	0	0	0	0	0	0
Xerosis, legs	0	0	40.1	23.1	62.6	53.3	37.1	34.1	36.1	43.5	54.7	57.8	62.5	57.7	40.0	44.4	20.0	48.0
Xerosis, others	0	0	2.6	0	6.6	3.0	4.3	0.7	2.3	3.5	20.0	16.5	12.5	11.5	0	7.4	0	2.0
Lower Extremities:																		
Bilateral Edema	0	0	0	0	0	0.6	0	0	0	0	0	0	0	0	0	3.7	0	0
Blood Pressure 140/90 & above . .	0	0	0	0	0	0	0	0	5.1	5.9	7.4	3.7	9.4	26.9	0	3.7	0	5.1

TABLE 2 - SUMMARY OF CLINICAL FINDINGS IN CAGAYAN VALLEY-BATANES REGION

		No. of Subjects 1719	Per cent
GENERAL APPEARANCE	Good	456	26.53
	Fair	1189	69.17
	Poor	74	4.30
DEFICIENCY	SIGNS		
VITAMIN - A	Xerosis, legs	731	42.52
	Dry Conjunctiva	523	30.42
	Xerosis, other	83	4.83
	Bitot's Spot	10	0.58
	Hyperkeratosis, Follicular, other.	6	0.35
	Hyperkeratosis, Follicular, arms	1	0.06
THIAMINE	Bilateral Edema	2	0.12
RIBOFLAVIN	Angular Scars	543	31.59
	Nasolabial Seborrhea	43	2.50
	Conjunctival Injection	25	1.45
	Active Angular Stomatitis	21	1.22
	Circumcorneal Injection	2	0.12
NIACIN	Significant Papillary Changes	650	37.81
	Pellagrous Dermatitis	2	0.12
VITAMIN - C	Bleeding Gums	354	20.59
	Marginal Gingivitis	24	1.40
VITAMIN - D	Bossing	20	1.16
	Chest Deformities	16	0.93
	Winged Scapula	10	0.58
IODINE	Thyroid, Enlarged	84	4.89

TABLE 3. - AGE GROUP DISTRIBUTION OF SUBJECTS FOUND POSITIVE FOR PARASITES IN CAGAYAN VALLEY-BATANES REGION

AGE	0-11 mos.		1-6 yrs.		7-12 yrs.		13-20 yrs.		21-39 yrs.		40-59 yrs.		60 yrs. & above		Total	
No. of SUBJECTS	No. 52	%	No. 299	%	No. 276	%	No. 196	%	No. 289	%	No. 180	%	No. 46	%	No. 1338	%
1. Ascaris lumbricoides																
a) Ascaris alone	5	9.6	235	78.6	221	80.1	138	70.4	150	51.9	82	45.6	22	47.8	853	63.8
b) Ascaris w/ trichuris	0	0	11	3.7	9	3.3	3	1.5	3	1.0	6	3.3	3	6.5	35	2.6
c) Ascaris w/ hookworm	0	0	21	7.0	23	8.3	18	9.2	40	13.8	17	9.4	3	6.5	122	9.1
d) Ascaris w/ hookworm and trichuris	0	0	0	0	0	0	1	0.5	0	0	0	0	2	4.4	3	0.2
e) Ascaris w/ Enterobius vermicularis	0	0	1	0.3	1	0.4	0	0	3	1.0	0	0	0	0	5	0.4
2. Trichuris trichura																
a) Trichuris alone	0	0	1	0.3	1	0.4	4	2.0	3	1.0	5	2.8	0	0	14	1.0
b) Trichuris w/ Enterobius vermicularis	0	0	0	0	0	0	1	0.5	0	0	0	0	0	0	1	0.07
3. Hookworm																
a) Hookworm alone	0	0	3	1.0	14	5.1	17	8.7	42	14.5	30	16.7	8	17.4	114	8.5
b) Hookworm with trichuris	0	0	0	0	1	0.4	0	0	0	0	0	0	0	0	1	0.07
c) Hookworm with Enterobius vermicularis	0	0	0	0	0	0	1	0.5	0	0	0	0	0	0	1	0.07
4. Enterobius vermicularis																
a) Enterobius alone	0	0	1	0.3	0	0	1	0.5	2	0.7	1	0.6	0	0	5	0.4
5. Total subjects with parasites	5	9.6	273	91.3	270	97.8	184	93.9	243	84.1	141	78.3	38	82.6	1154	86.2

TABLE 4

COMPARATIVE PREVALENCE OF CLINICAL FINDINGS IN ILOCOS-MOUNTAIN PROVINCE AND THE CAGAYAN VALLEY-BATANES REGIONS

DEFICIENCY	SIGN	Ilocos-Mountain Province 1519 subjects PERCENT	Cagayan Valley-Batanes 1719 subjects PERCENT
VITAMIN A	Xerosis, legs	8.89	42.52
	Dry conjunctiva	6.58	30.42
	Xerosis, other	0.79	4.83
	Bitot's spot	0.39	0.58
	Hyperkeratosis, follicular, other	0.86	0.35
	Hyperkeratosis, follicular, arms	0.00	0.06
THIAMINE	Bilateral edema	0.76	0.12
RIBOFLAVIN	Angular scars	2.04	31.59
	Nasolabial seborrhea	0.92	2.50
	Conjunctival injection	4.81	1.45
	Active angular stomatitis	1.84	1.22
	Circumcorneal injection	0.33	0.12
NIACIN	Significant papillary changes	15.27	37.81
	Pellagrous dermatitis.............	0.00	0.12
VITAMIN C	Bleeding gums	25.08	20.59
	Marginal gingivitis	1.65	1.40
VITAMIN D	Bossing	1.97	1.16
	Chest deformities	0.26	0.93
	Winged scapula	1.05	0.58
IODINE	Thyroid, enlarged	6.85	4.89

SUMMARY AND DISCUSSION OF SURVEY RESULTS

By Leon G. Alejo

Findings of this survey showed that the average diet in the Cagayan Valley-Batanes region is one of rice and vegetables, with very much less than the recommended amounts of all the other food groups necessary for a well rounded and varied diet. The intake of milk and milk products was grossly inadequate and amounted only to 11.8% of the recommended food allowance.

Calories

Although this survey revealed that average intake of cereals was 107.1% of the recommended food allowance, the corresponding intakes of other food groups likewise considered as sources of carbohydrates, i.e., "Starches, Roots and Tubers" and "Sugars and Syrups" were found inadequate. It was not surprising therefore to find that per capita calorie intake amounted to only 80.9% of the requirement for calories. Corroborative clinical findings indicated that only 26.5% of the subjects showed "good" general appearance, with 4.3% in the "poor" category. In contrast to the above findings, we may cite the results of our surveys in Bicol and Central Luzon where the respective calorie intakes were 101% and 94% of the requirements and these were reflected in the findings of 62.7% and 76.3% of the subjects of respective regions having "good" general appearance. While the carbohydrates supplied 78.5% of the total calorie requirement for Cagayan Valley-Batanes which is close to those in Bicol (70.8%) and Central Luzon (77.7%), the consumption of fats and oils was only 27.6% of the recommended food allowance as compared to 115.8% (due to high coconut intake) and 60.5% in the Bicol and Central Luzon regions respectively.

Protein

Like the previous findings from regional surveys in Luzon, no definite evidence of any protein deficiency was observed in the region. An average protein intake amounting to 86.6% of the recommended allowance was reported in the survey areas, with 30.0% of the amount coming from animal sources. But due to the inadequacy in calorie intake, some of the protein foods are possibly being utilized for energy requirements instead of being used, as they preferably should, for building up and/or repairing body tissues. The average total serum protein level for the region was 7.18 gm/100 ml which is in the "acceptable" level and which incidentally is also the rating for 69.8% of the subjects. The findings on the protein nutriture in the region is apparently confirmed by our observations on the serum albumin and serum globulin levels, as well as on the albumin: globulin ratio which were found to be in the "acceptable", "good" and "acceptable" categories respectively.

Calcium

Due to the low average milk intake which amounted to only 11.8% of the recommended food allowance, it is estimated that the dietary calcium is enough to supply only 38.8% of the recommended allowance for the said mineral. This figure followed more or less the trends found in the previous regional surveys conducted by the Food and Nutrition Research Center. Because milk is relatively a very expensive food item, the enhancement of the calcium intake in the region can be more advantageously pursued and economically achieved by more frequent use of small fishes, shrimps and shell fishes, as well as leafy and yellow vegetables in the dietaries.

Iron

Again, like in all previous surveys, the dietary iron intake was found to be high amounting to 150.0% of the recommended allowances. However, this value is for total iron which includes both the "available" iron, which is assimilable by the body, and the non-assimilable form as well. Also to be noted is the adverse clinical finding to the effect that parasitism was found in 86.2% of the subjects. All these factors could probably help explain the low results obtained from the biochemical tests which gave an average hemoglobin level of 12.34 gm/100 ml for all subjects, which is a "low" rating. What makes the nutritional picture grave is the fact that the vulnerable groups, i.e. the 1 to 6 year-olds and the pregnant mothers, gave the lowest mean values. In view of the above, a certain amount of iron deficiency anemia may therefore be expected particularly among the said groups.

Iodine

Clinical examination showed the presence of enlarged thyroid gland on 4.89% of all the subjects. Among the group of pregnant women, 45.9% showed the same suggestive sign of iodine deficiency.

Vitamin A and Carotene

Survey findings showed an average total dietary vitamin A intake amounting to only 63.9% of the recommended allowance. This figure is to be expected inasmuch as the population is getting only 35.3% and 68.2% of the corresponding allowances for "Leafy and Yellow Vegetables" and "Meat, Poultry and Fish" which are the principal dietary sources of these nutrients. Signs suggestive of vitamin A deficiency were noted in the physical examination of the subjects. Among such findings were leg xerosis and dry conjunctivae which were observed in 42.5% and 30.4% respectively, of the subjects examined. In support of the above clinical data, biochemical findings showed the "deficient" to "low" category of mean serum vitamin A and carotene levels in 38.1% and 75.8% respectively of the subjects tested. In view of the above, it is quite apparent that one important step that can be made towards the improvement of the regional dietary is the popularization of the "Leafy and Yellow Vegetables" and the more frequent and adequate intake of the same in their daily fare.

Thiamine

The average dietary intake for this nutrient was found to be only 65.0% of the recommended allowance. Although "low" levels of urinary thiamine excretion were found in 33.8% of the adult subjects, only 0.1% of all the subjects showed signs suggestive of beriberi. This may be due to the fact that its mild form is difficult to detect upon physical examination and that only advanced cases can be seen in surveys of this nature.

Riboflavin

Following the trend in our previous survey findings, the dietary riboflavin intake, next to calcium was the most deficient. The average intake amounted to only 40.6% of the recommended allowance. Corroborative signs suggestive of its deficiency were found in many of the subjects, along with 31.6% of them showing angular scars. Urinary riboflavin excretions were in the "deficient" to "low" levels in 56.6% of the adult subject examined.

Niacin

This is one of those nutrients whose average intake was regularly shown by our surveys to be more than adequate. The present survey found it to be 115.0% of the recommended allowance. However, physical examination made on the subjects showed suggestive signs of niacin deficiency significant papillary changes in 37.8% of them, besides two subjects found with pellagrous dermatitis. An inspection of the dietaries of the households of the region revealed that corn and its by-products made up 20.6% of the cereal requirements. Niacin deficiency is generally associated with groups using corn as a staple food. No satisfactory biochemical method for estimating niacin nutriture in field surveys is at hand, hence no niacin measurement was included in our biochemical phase work.

Ascorbic Acid

The average dietary intake for this nutrient, like those for iron and niacin was found to be more than the recommended allowance (116.9%) and this could be principally due to the fact that our surveys are generally undertaken during the season when fruits and other vitamin C-rich foods are beginning to be plentiful. However, a check of the sources of the dietary vitamin C of the population revealed that 72.6% of this nutrient are obtained from food materials which had to be cooked. Because of the heat-labile nature of this nutrient, and possibly together with faulty methods of cooking and food handling, considerable nutrient losses must have occurred even before their food was ready for the table. Attributable to the above is the clinical finding on 20.6% of the subjects with bleeding gums. Likewise, biochemical tests showed that 45.6% of the subjects have serum vitamin C level in the "deficient" to "low" category.

CONCLUSION

Although protein deficiency does not appear to be a problem in the region, an increase in calorie intake is recommended in order to make possible the fuller utilization of protein as a tissue builder. Deficiencies in vitamin A, thiamine, riboflavin, ascorbic acid, calcium, iron and iodine were noted.

Initial steps towards improving the nutritional status of the population surveyed must necessarily involve improvement in their dietary habits, specifically the utilization of more leafy and yellow vegetables and small fishes, shrimps and shell fishes in their dietaries-besides improving their cooking practices in order to make possible a more efficient and fuller utilization of food nutrients. To this end also, the use of raw and/or fresh vegetables and fruits should be encouraged as much as possible.

Because nutrition is such a multifaceted problem, its solution can be greatly facilitated through an integrated and cooperative effort on the part of the agriculture, education, health, rural improvement and social welfare agencies. To stave off further inroads of malnutrition on the greater segment of our population, the united and concerted approach to the above problem should be started without delay.

APPENDICES

APPENDIX A

COMMON and SCIENTIFIC NAMES OF SOME VEGETABLES FRUITS, FISH, etc., USED IN CAGAYAN VALLEY-BATANES REGION

APRIL-JUNE, 1961

COMMON NAME	SCIENTIFIC NAME	ENGLISH NAME
I. VEGETABLES:		
A. Green, Leafy and Yellow Vegetables		
1. Ampalaya, dahon	Momordica charantia Linn.	Bitter melon leaves
2. Alibangbang	Bauhinia malabarica Roxb.	- - - - - -
3. Alugbati	Bacella rubra Linn.	Malabar nightshade
4. Kalabasa	Cucurbita maxima Duchesne	Squash
5. Kamote, talbos	Ipomoea batatas Linn. Poir	Sweet potato, young leaves
6. Kamoti-kamotihan	Operculina turpethum (Linn.) S. Manso	Sweet Turpeth root, young leaves
7. Kangkong	Ipomosa aquatica Forsk.	Swamp cabbage
8. Kintsay	Apium gravelens Linn.	Chinese celery
9. Kulitis	Amaranthus viridis Linn.	Spineless amaranth
10. Kutsay	Alium porum Linn.	Leek
11. Gabi, dahon	Colocasia esulentum (Linn.) Schoot and Endl.	Taro Leaves
12. Himbabao, dahon	Allaeanthus luzonicus (Blanco) F. Vill.	- - - - -
13. Malunggay	Moringa oleifera Lam.	Horse radish leaves
14. Mustasa	Brassica integrifolia (West) O.E. Schultz	Mustard
15. Paayap, talbos	Vigna sinensis (Linn) Savi	Cowpeas, young leaves
16. Pako	Athyrium esculentum (Razt.) Copel	Fern
17. Patola, talbos	Luffa cylindrica Linn. M. Room	Sponge gourd, young leaves
18. Petsay	Brassica chinensis Linn.	Chinese cabbage
19. Saluyot	Corchorus olitorious Linn.	Jute
20. Sili labuyo, dahon	Capsicum frutescens (Linn.)	Chili pepper leaves
21. Sitaw, talbos	Vigna sinensis var. sesquipedalis Fruw.	Yard-long bean leaves
B. Leguminous Pods		
1. Abitsuelas	Phaseolus vulgaris Linn.	Snap bean, pods
2. Paayap	Vigna sinensis (Linn) Savi	Cowpea bean
3. Patani	Phaseolus lunatus Linn.	Lima beans
4. Sigarilyas	Psophocarpus tetragonolobus (Linn.) DC.	Goa or winged bean
5. Sitaw	Vigna sinensis var. sesquipedalis Fruw.	Yard-long bean
6. Sitsaro	Pisum sativum Linn.	Sweet pea
C. Pulses, Nuts and Seeds		
1. Abitsuelas, puti	Phaseolus vulgaris Linn.	Snap bean, white
2. Kadyos, buto	Cajanus cajan (Linn.) Millsp.	Pigeon pea
3. Munggo	Phaseolus aureus Roxb.	Mung bean
D. Other Vegetables		
1. Ampalaya, bunga	Momordica charantia (Linn)	Bitter melon
2. Balbalulang	Hydroclathrus cancellatus Bory	Seaweed
3. Balimbing	Averrhoa carambola Linn.	Carambola
4. Bawang	Allium sativum (Linn.)	Garlic
5. Bignay	Antidesma bunius (Linn.) Spreng	- - - -

COMMON NAME	SCIENTIFIC NAME	ENGLISH NAME
6. Buko	Cocos nucifera (Linn.)	Young coconut
7. Kabuti	- - - - - - - -	Mushroom
8. Kakawati	Gliciridia sepium (Jacq.) Steud	- - - - - - - -
9. Katuray, bulaklak	Sesbania grandiflora (Linn.) Pers.	Sesban flower
10. Kamias	Averrhoa balimbi Linn.	Balimbi
11. Kulot	Laurencia sesticulosa (Forsk.) Grev.	Seaweed
12. Labong	Bambusa spinosa Roxb.	Bamboo shoot
13. Langka, hilaw	Artocarpus heterophylus Lam.	Jackfruit, unripe
14. Okra	Hibiscus esculentus (Linn.) Moench	Okra
15. Rimas, hilaw	Artocarpus communis Forst.	Breadfruit, unripe
II. FRUITS:		
A. Vitamin C-Rich		
1. Dayap	Citrus aurantifolia (Christm.)	Lime
2. Datiles	Muntingia calabura Linn.	- - - - - - - -
3. Kabuyaw	Citrus hystrix DC	- - - - - - - -
4. Kalamansi	Citrus microcarpa Bunge	- - - - - - - -
5. Kamatsili	Pithecolobium dulce (Roxb.) Benth	Astec kwanochill
6. Siniguelas	Spondias purpurea Linn.	Spanish plum
7. Tiesa	Lucuma nervosa A. DC	Carristel, tiesa
B. Other Fruits		
1. Abokado	Persea americana Mill	Avocado
2. Anonas	Anona reticulata Linn.	Anonas
3. Bignay	Antidesma bunius (Linn.)Spreng	- - - - - - - -
4. Duhat	Syzgium cumini (Linn.) Skeels	Black Java plum
5. Guwayabano	Anôna muricata Linn.	Soursop
6. Kaimito	Chrysophyloum cainito Linn.	Star apple
7. Kakaw, hinog	Theobroma cacao Linn.	Cacao beans, ripe
8. Makopa	Syzygium samarangense (Blume)	Curacao apple
9. Mangga	Mangifera indica Linn.	Mango
10. Pinya	Ananas comosus Linn. Merr.	Native pineapple
11. Saging	Musa sapientum Linn.	Banana
12. Sampalok	Tamarindus indica Linn.	Tamarind
13. Santol	Sandoricum Koetjape (Burm.f.) Merr.	- - - - - - - -
III. FISH and FISH PRODUCTS		
1. Alakaak	Pseudosciaena anea	Plain croaker
2. Albakora	Neothunnus macropterus	Yellow fin tuna
3. Alumahan	Rastrelliger chrysozonus	Striped mackerel
4. Ayungin	Therapon plumbeus	Grunt, silver
5. Bagoong alamang	Acetes indicus	Small shrimp fermented
6. Bagoong isda	Stolephorus sp.	Long-jawed anchovy salted and fermented
7. Bahoyo	Neothunnus macropterus	Yellow fin tura
8. Banak	Mugil vaigiensis	Long-finned mullet
9. Bangus	Chanos chanos	Milkfish
10. Biang puti	Glossogobius giurus	Flat-headed goby
11. Bisugo	Nemipterus taeniopterus	Ribbon-finned nemipterid
12. Bulador	Cypselurus oligolepis	Small-scaled flying fish
13. Kanduli	Arius manillensis	Manila sea catfish
14. Kugaw (Hamale)	Polynemidae	Threadfin
15. Dalag	Ophicephalus stiatus	Mudfish

COMMON NAME	SCIENTIFIC NAME	ENGLISH NAME
16. Dalagang-bukid	Caesio chrysozomus	Golden caesio
17. Dilis	Stolephorus commersoni	Long-jawed anchovy
18. Espada	Trichiurus haumela	Hairtail
19. Galunggong	Decapterus macrosoma	Scar
20. Hasa-hasa	Rastrelliger brachysomus	Short-bodied mackeral
21. Hito	Clarias batrachus	Catfish fresh water
22. Idik	Arius leiototocephalus	Sea catfish
23. Martiniko	Anabas testudineus	Climbing perch
24. Matang-baka	Carenx crumenophthalmus	Scad, big-eyed
25. Sapsap	Leiognathus equulus	Common slip mouth
26. Talakitok	Caranx sexfasciatus	Banded cavalla
27. Talilong	Mugil melanopterus	Black-finned mullet
28. Talimusak	Oxyurichthys microlepsis.	Goby, long finned
29. Tamban	Sardinella longiceps	Indian sardine
30. Tawilis	Harengula tamilis	Fresh water herring
31. Tilapia	Tilapia mossambrica	Leather jacket
32. Tulingan	Auxis thazard	Tuna bonito
33. Tunsoy	Sardinella fimbriata	Fimbriated herring
III. CRUSTACEANS and MOLLUSKS		
1. Alamang	Atyidae Leander Sp.	Small shrimp
2. Alimango	Scylla serrata	Crab meat
3. Hipon	Palaemonidae	Shrimps
4. Paros	Soletellina (psammotaea) elongata	- - - - - -
5. Pusit	Loligo pealii	Squid
6. Sugpo	Penaeus monodon Fab.	Tiger prawn
7. Ulang	Palaemonidae	Lobster
IV. MISCELLANEOUS		
1. Gulaman	Gracilaria conforvoides	Ceylon moss
2. Tuba	Nipa fruticans	Fermented palm sap

APPENDIX B

TABLE I

RECOMMENDED DAILY ALLOWANCES FOR SPECIFIC NUTRIENTS 1/

FOOD AND NUTRITION RESEARCH CENTER, 1960
(REVISED)

	CALO-2/ RIES	PROTEIN (GM)	CALCIUM (GM)	IRON 5/ (MG)	VIT.A(I.U.)3/	THIAMINE4/ (MG)	ASCORBIC ACID (MG)	VIT.D(I.U.)6/	RIBOFLA-4/ VIN (MG)	NIACIN 4/ (MG)
MAN (53 KG.)										
SEDENTARY.	2,100	55	0.7	6	4,000	1.3	75		1.4	13
MODERATELY ACTIVE . . .	2,600	55	0.7	6	4,000	1.6	75		1.4	16
VERY ACTIVE	3,400	55	0.7	6	4,000	2.0	75		1.4	20
WOMAN (45 KG.)										
SEDENTARY	1,900	45	0.7	10	4,000	1.1	70		1.1	11
MODERATELY ACTIVE . . .	2,300	45	0.7	10	4,000	1.4	70		1.1	14
VERY ACTIVE	3,000	45	0.7	10	4,000	1.8	70		1.1	18
PREGNANCY (LATTER HALF) 7/	2,300	75	1.5	21	5,000	2.0	100	300-400	1.9	20
LACTATION	2,800	85	2.0	21	7,000	2.0	150	300-400	2.1	20
CHILDREN UP TO 12 YEARS 8/										
UNDER 1 YEAR 9/. . . .	100 PER KG.	3-1/2 PER KG.	1.0	5	1,500	0.6	30	300-400	0.6	6
1 - 3 YRS.	1,200	40	1.0	5	2,000	0.5	35		1.0	5
4 - 6 YRS.	1,400	45	1.0	5	2,500	0.6	50		1.1	6
7 - 9 YRS.	1,800	55	1.0	5	3,000	0.8	60	300-400	1.4	8
10 -12 YRS.	2,300	60	1.2	5	4,000	1.0	75		1.5	10
CHILDREN OVER 12 YEARS										
GIRLS: 13-15 YRS. . .	2,500	70	1.3	12	4,500	1.1	80		1.8	11
16-20 YRS. . .	2,200	60	1.0	12	4,000	1.0	80		1.5	10
BOYS : 13-15 YRS. . .	2,800	75	1.4	7	5,000	1.3	90		1.9	13
16-20 YRS. . .	3,600	85	1.4	7	6,500	1.6	100		2.1	16

1. Objectives toward which to aim in planning practical dietaries: The recommended allowances can be attained with a good variety of common foods which also provide other minerals and vitamins for which requirements are less well known.
2. Calorie allowances must be adjusted up or down to meet specific needs. The calorie values in the table are therefore not applicable to all individuals but rather represent group averages. The proper calorie allowance is that which over an extended period will maintain body weight or rate of growth at the level most conducive to well-being.
3. The allowance depends on the relative amounts of vitamin A and carotene. The allowances of the table are based on the premise that approximately two-thirds of the vitamin A value of the average diet in this country is contributed by carotene and that carotene has half or less than half the value of vitamin A.
4. For adults (except pregnant and lactating women) receiving diets supplying 2000 calories or less, such as reducing diets, the allowances of thiamine and niacin may be 1 mg. and 10 mg. respectively. The fact that figures are given for different calorie levels for thiamine and niacin does not imply that we can estimate the requirement of these factors within 500 calories, but they are added merely for simplicity of calculation. In the present revision, riboflavin allowances are computed by multiplying the protein requirement by the factor .025 as used on the latest revision of the American Recommended Daily Allowances. Other members of the B-complex also are required though the values can be given. Food supplying adequate thiamine, riboflavin, and niacin will tend to supply sufficiently the remaining B vitamins.
5. There is evidence that the male adult needs relatively little iron. The need will usually be provided for if the diet is satisfactory in other respects.
6. The need for supplemental vitamin D by vigorous adults leading a normal life seems to be minimum. For persons working at night and for nuns and others whose habits shield them from the sunlight, as well as for elderly persons, the ingestion of small amounts of vitamin D is desirable.
7. During the latter part of pregnancy the calorie allowance should increase to approximately 20 per cent above the preceding level. The value of 2300 calories represents the allowance of pregnant, sedentary women.

8. Allowances for children are based on the needs for the middle year in each group (as 2, 5, 8, etc.) and are for moderate activity and for average weight at the middle year of the age group.

9. Needs for infants increase from month to month with size and activity. The amounts given are for approximately 6 to 8 months. The dietary requirements for some of the nutrients such as protein and calcium are less if derived largely from human milk.

Further Recommendations: (NATIONAL RESEARCH COUNCIL, 1948)

FAT. There is little information available concerning the human requirement for fat. Fat allowances must be based at present more on food habits than on physiological requirements. While a requirement for certain unsaturated fatty acids (the linoleic and arachidonic acids of natural fats) has been amply demonstrated with experimental animals, the human needs for these fatty acids are not known. In spite of the paucity of information on this subject there are several factors which make it desirable (1) that fat be included in the diet to the extent of at least 20 to 25 per cent of the total calories and (2) that the fat intake include essential unsaturated fatty acids to the extent of at least 1 per cent of the total calories. At higher levels of energy expenditure, e.g., for a very active person consuming 4500 calories and for children and adolescent persons, it is desirable that 30 to 35 per cent of the total calories are derived from fat. Since foodstuffs such as meat, milk, cheese, nuts, etc., contribute fat to the diet, it is necessary to use separated or "visible" fats such as butter, oleomargarine, lard, or shortenings to supply only one-third to one-half of the amounts indicated.

WATER. A suitable allowance of water for adults is 2.5 liters daily in most instances. An ordinary standard for diverse persons is one milliliter for each calorie of food. Most of this quantity is contained in prepared foods. At work or in hot weather, requirements may reach 5 to 13 liters daily. Water should be allowed ad-libitum, since sensations of thirst usually serve as adequate guides to intake except for infants and sick persons.

SALT. The needs for salt and for water are closely interrelated. A liberal allowance of sodium chloride for the adult is 5 grams daily, except for some persons who sweat profusely. The average normal intake of salt is 10 to 15 grams daily, an amount which meets the salt requirement for a water intake up to 4 liters daily.

When sweating is excessive, one additional grams of salt should be consumed for each liter of water in excess of 4 liters daily. With heavy work or in hot climates 20 to 30 grams daily may be consumed with meals and in drinking water. Even then, most persons do not need more salt than usually occurs in prepared foods. It has been shown that after acclimatization person produce sweat that contains only about 0.5 gram to the liter in contrast with a content of 2 to 3 grams for sweat of the unacclimatized person. Consequently after acclimatization, need for increase of salt beyond that of ordinary food disappears.

IODINE. The requirement for iodine is small, probably about 0.002 to 0.004 mg. daily for each kilogram of body weight, or a total of 0.15 to 0.30 mg. daily for the adult. This need is met by the regular use of iodized salt; its use is especially important in adolescence and pregnancy.

PHOSPHORUS. Available evidence indicates that the phosphorus allowances should be at least equal to those for calcium in the diets of children and of women during the latter part of pregnancy and during lactation. In the case of other adults the phosphorus allowances should be approximately 1.5 times those for calcium. In general it is safe to assume that if the calcium and protein needs are met through common foods, the phosphorus requirement also will be covered, because the common foods rich in calcium and protein are also the best sources of phosphorus.

COPPER. The requirement for copper for adults is about 1 to 2 mg. daily. Infants and children require approximately 0.05 mg. for each kilogram of body weight. The requirement for copper is approximately one-tenth that for iron. A good diet normally will supply sufficient copper.

VITAMIN K. The requirement for vitamin K usually is satisfied by any good diet except for the infant in utero and for the first few days after birth. Supplemental vitamin K is recommended during the last month of pregnancy. When it has not been given in this manner, it is recommended for the mother preceding delivery or for the baby immediately after birth.

FOLIC ACID. Evidence for recognizing folic acid (pteroylglutamic acid, vitamin Bc, L. casei factor or vitamin M) as an essential human nutrient is presented in the text. The quantitative requirement cannot be closely estimated from evidence now available.

Population: 29,537,000 as of January 1, 1963

APPENDIX G

TABLE II

RECOMMENDED DAILY FOOD ALLOWANCES BY SEX GROUP ACTIVITY AND AGE GROUP

FOOD AND NUTRITION RESEARCH CENTER

	(1) LEAFY & YELLOW VEGETABLES		(2) VITAMIN C RICH FOODS		(3) OTHER FRUITS & VEGETABLES		(4) FATS	(5) PROTEIN-RICH FOODS						(6) ENERGY FOODS			
								WHOLE MILK	MEAT POULTRY & FISH		EGGS		BEANS & NUTS (DRIED)	CEREALS	KAMOTE POTATOES & Other Tubers		SUGAR
	A.P. GM.	E.P. GM.	A.P. GM.	E.P. GM.	A.P. GM.	E.P. GM.	A.P. GM.	E.P. GM.	A.P. GM.	E.P. GM.	A.P. NO.	E.P. GM.	A.P.- E.P. GM.	A.P.-E.P. GM.	A.P. GM.	E.P. GM.	A.P.-E.P. GM.
MAN - 53 KG.																	
SEDENTARY	125	80	120	80	125	100	30	-	140	100	1/3	10	20	350	60	50	35
MODERATELY ACTIVE	125	80	120	80	125	100	35	-	140	100	1/3	10	20	450	90	75	40
VERY ACTIVE	155	100	150	100	185	150	50	-	140	100	1/3	10	20	550	120	100	55
WOMAN - 45 KG.																	
SEDENTARY	125	80	120	80	125	100	20	-	105	75	1/3	10	20	325	30	25	25
MODERATELY ACTIVE	125	80	120	80	125	100	30	-	105	75	1/3	10	20	375	60	50	35
VERY ACTIVE	155	100	150	100	185	150	45	-	105	75	1/3	10	20	500	60	50	40
PREGNANCY (LATTER HALF)	155	100	150	100	125	100	20	200	230	165	1	30	20	325	60	50	25
NURSING	155	100	150	100	125	100	40	450	230	165	1	30	20	350	60	50	45
INFANT																	
UNDER 1 YEAR (6 MONTHS)	30	20	45	30	25	20	-	200	15	10	1/2	15	-	0	25	20	20
CHILDREN UP TO 12 YRS.																	
1 - 3 YEARS	45	30	120	80	45	35	10	450	90	65	1/3	10	10	125	50	50	10
4 - 6 YEARS	55	35	120	80	65	50	15	300	105	75	1/3	10	10	175	60	50	20
7 - 9 YEARS	60	40	120	80	125	100	15	200	160	115	1/3	10	20	250	60	50	25
10 - 12 YEARS	95	60	150	100	125	100	30	200	180	130	1/3	10	20	300	90	75	35
CHILDREN OVER 12 YEARS																	
GIRLS: 13-15 YRS.	125	80	150	100	125	100	35	200	265	190	1	30	15	375	75	65	30
16-20 YRS.	125	80	150	100	125	100	35	200	230	165	1	30	15	300	75	65	30
BOYS: 13-15 YRS.	155	100	150	100	125	100	35	200	265	190	1	30	20	450	75	65	30
16-20 YRS.	155	100	150	100	185	150	55	200	265	190	1	30	20	550	100	85	50
Per Capita gms. A.P.	106		130		118		28	162	149		16		17	329	71		32

1. A.P. -- AS PURCHASED
2. E.P. -- EDIBLE PORTION

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